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QUARTERLY REPORT

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Prepared By

APPLIED RESEARCH INC.
76 South Bayles Avenue
Port Washington, N. Y.

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1.0 ABSTRACT

1.10 This report covers work done on the development of an RF Spectroscope in the range from 100 MC to 1000 MC for the three month period from May 1, 1962 to July 31, 1962. It deals with the following subjects:

1.11 Purpose for the development.

1.12 Names of technical personnel engaged in the development program, together with a summary of the manhours work performed by each.

1.13 A description of the work done during the period from May 1, 1962 to July 31, 1962.

1.14 A project performance and schedule chart is included.

1.15 Program for the next three month interval.

→ Research is presented on,

~~2.0 PURPOSE FOR THE DEVELOPMENT~~

2.10 → ~~The~~ RF Spectroscope ~~shall be~~ being developed for the visual display of amplitude and frequency of RF signals in the frequency range of 100 MC to 1000 MC.

~~2.20~~ The frequency range of 100 MC to 1000 MC shall be displayed in four swept bands on a 5 inch oscilloscope screen.

~~2.30~~ The spectroscope shall have sweep coverage up to 300 MC electronically with high resolution, with no spurious responses and no internally generated interference.

~~2.40~~ It shall be useful as a search receiver, spectrum analyzer, noise interference analyzer or as monitoring equipment.

3.0 TECHNICAL PERSONNEL ENGAGED IN THE PROGRAM AND MAN HOURS

3.10 The following is a list of technical personnel engaged in the development of the spectroscope together with the total number of hours spent by each during the period from May 1, 1962 to July 31, 1962.

Name	Total Hours Per Man
Leonard Pollachek	144.50
Martin Heller	184.00
Earl Morrison	171.75
Thomas Vlismas	55.50
Joseph Fazzino	51.00
Melvin Merberg	10.50
Harry Brown	7.00
	624.25

4.0 DESCRIPTION OF WORK

4.10 During the period covered by this report, the following tasks have been undertaken.

4.11 The power supply for the spectroscope was ordered. This consists of two different types of power supply packages. Package type No. 1 supplies all units of the spectroscope except the RF heads. Package type No. 2 supplies power to each RF head. There will be a total of four type No. 2 packages, each supplying one of the four RF heads.

4.11.1 The No. 1 type power supply package has the following design objectives:

Input Voltage: 115V ±10%, 50 to 400 CPS, single phase

Output Voltage and Current	Regulation	Ripple
+205 to +210 VDC at 250 MA	0.1%	2 MV RMS
+200 VDC at 100 MA	0.01%	200 µv RMS
+33 VDC at 400 MA	0.1%	1 MV RMS
+30 VDC at 350 MA	0.01%	100 µv RMS
-23 VDC at 150 MA	0.1%	1 MV RMS
-20 VDC at 150 MA	0.01%	100 µv RMS
+28 VDC at 1.5 A	Unregulated	10%
6.3 VDC adj. ±0.5V at 7.5A	0.25%	50 µv RMS
6.3 VAC at 3.0A	Unregulated	—

4.11.2 The No. 2 type power supply package has the following design objectives:

Input Voltage: 115V ±10%, 50 to 400 CPS, single phase

Output Voltage and Current	Regulation	Ripple
+200 VDC at 0.1A	0.1%	2 MV RMS
6.3 VDC at 3.0A	0.25%	15 MV RMS

4.12 The Tektronix Model RM15 Mod. 101 was ordered as the oscilloscope for the spectroscope during this period. This scope was chosen in preference to the Hughes Memoscope which was at first considered for use with the spectroscope. The advantages of the Model RM15 over the Hughes Memoscope are as follows:

4.12.1 It has a more intense, sharper trace.

4.12.2 It is physically shorter and conserves cabinet space.

4.12.3 Its front panel layout is more compatible with the rest of the spectroscope.

4.12.4 It costs less.

4.12.5 It operates from a 50 CPS to 400 CPS source without modification.

4.12.6 The Tektronix scope has a self-contained delay line and wide band video amplifier appropriate for the display of spectrum signature.

4.13 During this period, the 775 MC to 30 MC converter, Unit No. 1A7A10, Dwg. No. B600813, Fig. 1 and photo Fig. 2, was breadboarded. The unit was aligned and tested. It has the following characteristics:

4.13.1	Input Signal Frequency:	775 MC
4.13.2	Local Oscillator Frequency:	402.5 MC (the second harmonic or 805 MC is used)
4.13.3	LO Power:	100 MW at 402.5 MC
4.13.4	Output Frequency:	30 MC
4.13.5	Conversion Gain:	Greater than 0 DB
4.13.6	Overall Bandwidth (3 DB Points):	3 MC

4.14 The 30 MC to 775 MC converter, Unit No. 1A7A14, Dwg. No. B600814, Fig. 3 and photo Fig. 2, was designed and breadboarded during this period. It was aligned and tested. It has the following characteristics:

4.14.1	Input Signal Frequency:	30 MC
4.14.2	Local Oscillator Frequency:	402.5 MC (the second harmonic or 805 MC is used)

4.14.3 LO Power: 100MW at 402.5 MC

4.14.4 Output Frequency: 775 MC

4.14.5 Conversion Gain: Greater than 0 DB

4.14.6 Bandwidth 1 DB: 4 MC

4.15 During this period, the 402.5 MC local oscillator, Unit 1A7A13, Dwg. No. A600812, Fig. 4 and photo Fig. 2, was designed and breadboarded. The unit was aligned and tested. At each of its two output ports is available at 402.5 MC greater than 150 MW of power into 50 ohms.

4.16 The power IF amplifier-linear detector, Unit 1A7A8, Dwg. No. D600802, Fig. 5 and photo Fig. 6, was designed and breadboarded during this period. It was aligned and tested. It has the following characteristics:

4.16.1 Dynamic Range: >35 DB

4.16.2 Output Voltage (Video): >20 volts

4.16.3 Bandwidth (3 DB): 7 MC

4.16.4 Data of DC output voltage versus input voltage at 775 MC for the power IF amplifier-linear detector is presented in Table I below:

Table I

Output volts DC versus input volts RMS at 775 MC for IF power amplifier-linear detector, Unit 1A7A8.

Input Volts (RMS) DBM	775 MC	Output Volts DC
+ 6	0.45	21.0
0	0.225	10.5
- 6	0.112	4.9
-12	0.056	2.2
-18	0.028	0.88
-24	0.014	0.32
-30	0.007	0.10

4.16.5 A plot of Table I is given in Fig. 7.

4.17 During this period, a lin-log IF amplifier, Unit 1A7A7, Dwg. No. D600806, Fig. 8, was designed and breadboarded. In the log mode of operation, the original breadboard model was sensitive to input signal level. Oscillation occurred when the input signal approached a critical level of -10 DBM. Below and above this level the amplifier was stable. In addition, the amplifier saturated too soon on large input signals. As a result, the dynamic range of the amplifier was too restricted. Accordingly, the breadboard was modified in the following manner:

4.17.1 Four transistor stages of the lin-log amplifier, which comprise the feed back section, were reduced to two stages. The two stages are each emitter followers. By reducing the gain of the feedback section, the lin-log amplifier in the log mode was made stable and its dynamic range increased.

4.17.2 The characteristics of the lin-log IF amplifier are as follows:

Center Frequency:	775 MC
Bandwidth (3 DB):	6 MC
Linear Mode Gain:	45 DB
Log Mode Gain:	35 DB (for small signals)

4.18 A lin-log IF preamplifier Unit 1A7A17, Dwg. No. C600853, Fig. 9, and photo Fig. 10, was designed and breadboarded during this period. It operates in front of the lin-log IF amplifier and, together with the latter, gives a gain of better than 60 DB in the lin mode of operation for small signals. The lin-log IF preamplifier has the following characteristics:

4.18.1 Center Frequency: 775 MC

4.18.2 Bandwidth (3 DB): 16 MC

4.18.3 Linear Mode Gain: 23 DB

4.18.4 Log Mode Gain: 20 DB (for small signals)

4.18.5 A test was conducted to determine the overall amplitude response from the input of the lin-log preamplifier to the output of the power IF amplifier-linear detector in the log mode. Results are presented in Table II below. Refer to block diagram, Dwg. No. R700449, Fig. 11.

Table II

Amplitude response from IF lin-log preamplifier input to output of power IF amplifier-linear detector.

775 MC input at Lin-Log IF Preamplifier in DBM	Linear Detector Output Volts DC
-90	0
-85	0.02
-80	0.06
-75	0.18
-70	0.4
-65	0.74
-60	1.08
-55	1.35
-50	1.46
-45	1.50
-40	1.55
-35	1.58
-30	1.60
-25	1.60
-20	1.62
-15	1.67
-10	1.73
- 5	1.82
0	2.0

4.18.6 A plot of Table II is shown in Fig. 12.

4.19 During this period, the lin-log IF amplifier was relocated in the overall system. This was done for the following reason. In the log mode, the bandpass of the lin-log IF amplifier increases as its input signal is made larger. The lin-log amplifier has been placed in front of the second set of IF bandpass defining filters in order that the overall desired system

bandpass remain constant in the log mode of operation. A new block diagram showing the current arrangements of components in the system is given in Dwg. No. R700449, Fig. 11.

4.20 During this period, two bandpass crystal filters were ordered and received. Each crystal filter is centered at 30 MC. Crystal filter No. 1 has a 3 DB bandwidth of 5 KC. Crystal filter No. 2 has a 3 DB bandwidth of 25 KC. Each of the crystal filters exhibited excessive spurious responses outside of its pass band under test. Each filter exhibited erratic behavior in testing. The filters were returned to the manufacturer for correction.

4.20.1 The results of tests performed on Crystal Filter No. 1 are as follows:

Insertion Loss:	-6.3 DB
Peak to Valley Ripple Across Flats:	0.6 DB
Bandwidth -3 DB:	4.3 KC
Bandwidth -6 DB:	5.8 KC
Bandwidth -60 DB:	19.3 KC
Spurious Responses:	$\geq$-64 DB low side to 16 MC $\geq$-70 DB high side to 49 MC

4.20.2 The results of tests performed on Crystal Filter No. 2 are as follows:

Insertion Loss:	-2.7 DB
Peak to Valley Ripple Across Flats:	0.4 DB
Bandwidth -3 DB:	24.6 MC
Bandwidth -6 DB:	27.7 MC
Bandwidth -60 DB:	95.8 MC
Spurious Responses:	$\geq$-57 DB to 25 MC $\geq$-57 DB to 49 MC

4.21 During this period, all units of the spectroscope have been

completed by engineering and released for fabrication.

4.22 A project performance and schedule chart is given in Dwg. No. SF-138, Fig. 13.

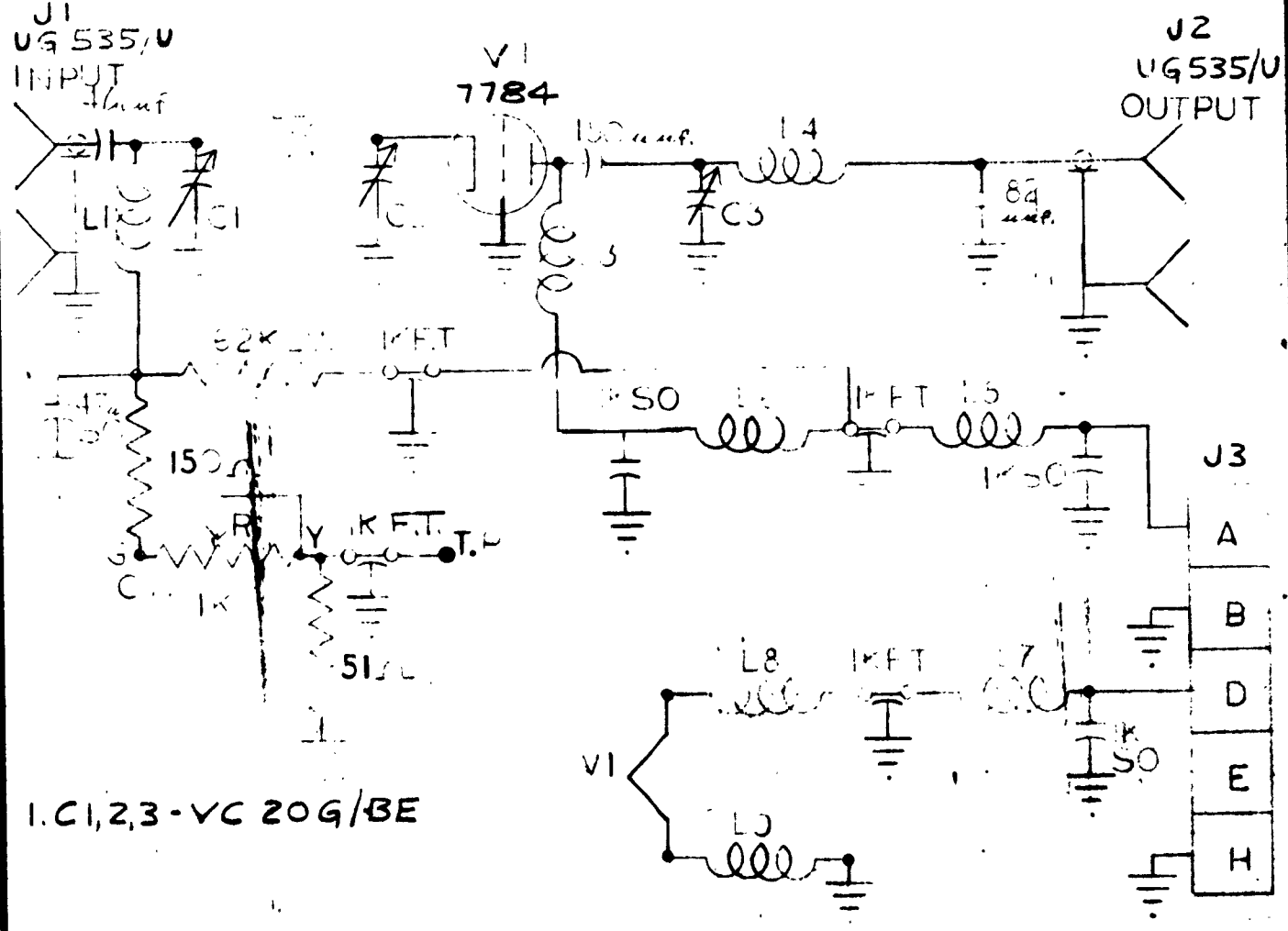
5.0 PROGRAM FOR THE NEXT THREE MONTH INTERVAL

5.10 During the next interval, it is expected that the following tasks will be completed.

5.11 All individual units will be fabricated.

5.12 The units will be final tested and assembled and wired in the cabinet.

5.13 Final system testing will be completed.



ALL DIMENSIONS IN INCHES. UNLESS OTHERWISE SPECIFIED TOLERANCES: FRACTIONS ± 1/64 ANGLES ± 1/2° DECIMALS .XX ± .010 .XXX ± .005	SCHEMATIC CONVERTER 775MC/ 30 MC UNIT 1A7A10	APPLIED RESEARCH INC. PORT WASHINGTON NEW YORK
MATERIAL:		DWG. SIZE A — 600813
FINISH:	JOB NO. 451-01 — DRAWN — SCALE	ISSUE A

Fig 1

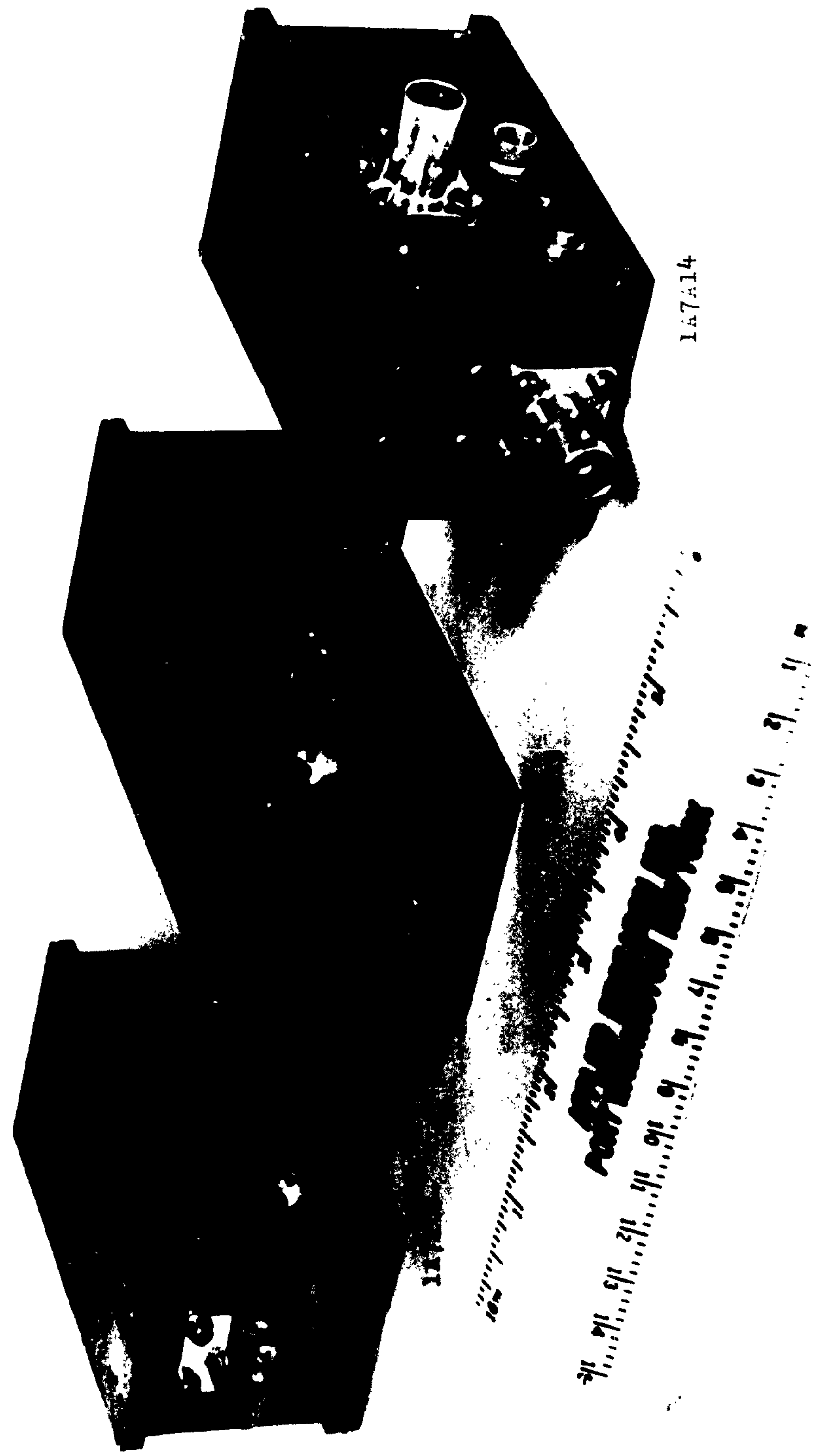
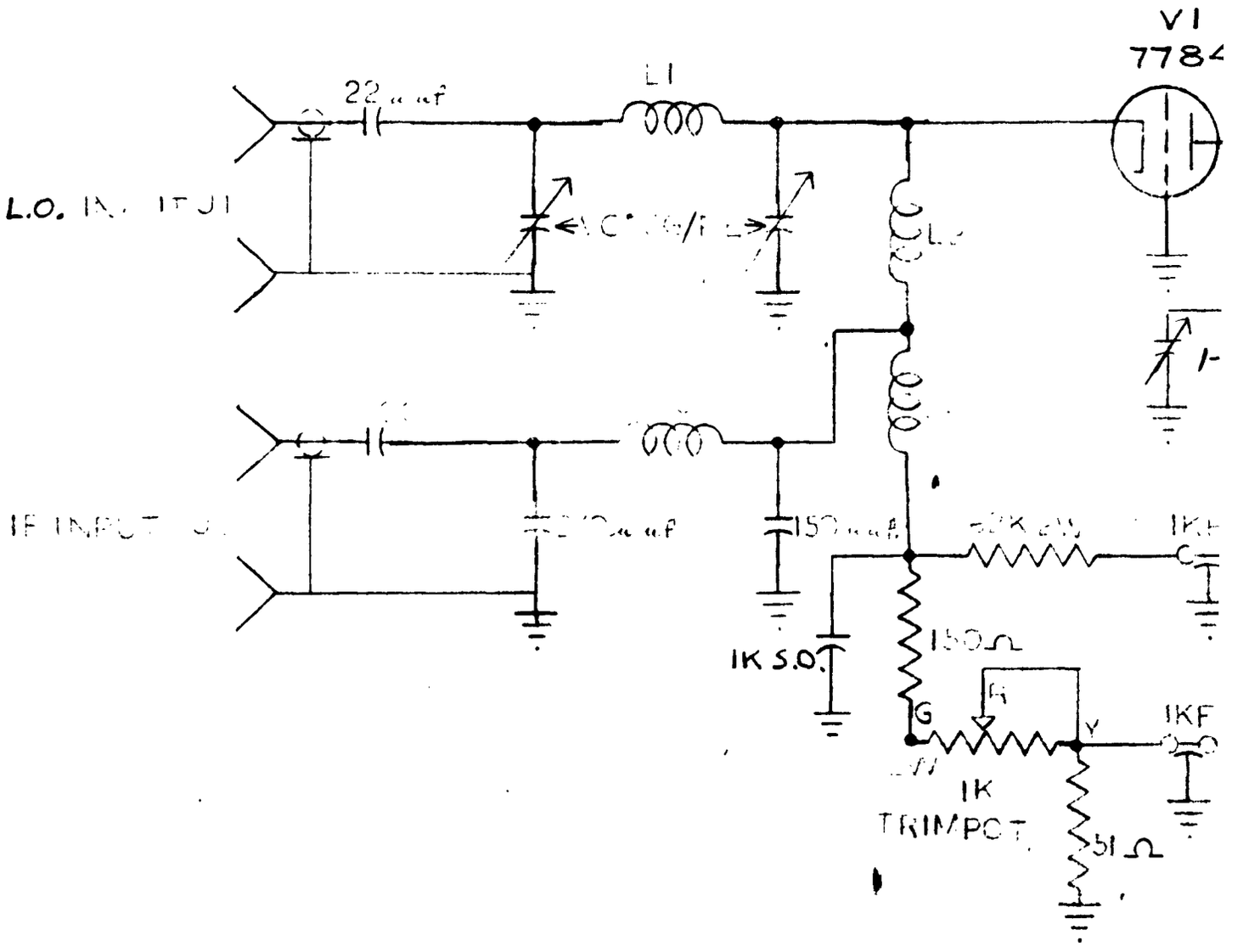


FIG. 2



[redacted]

491-01	
JOB NO.	NEXT ASSEMBLY
APPLICATION	

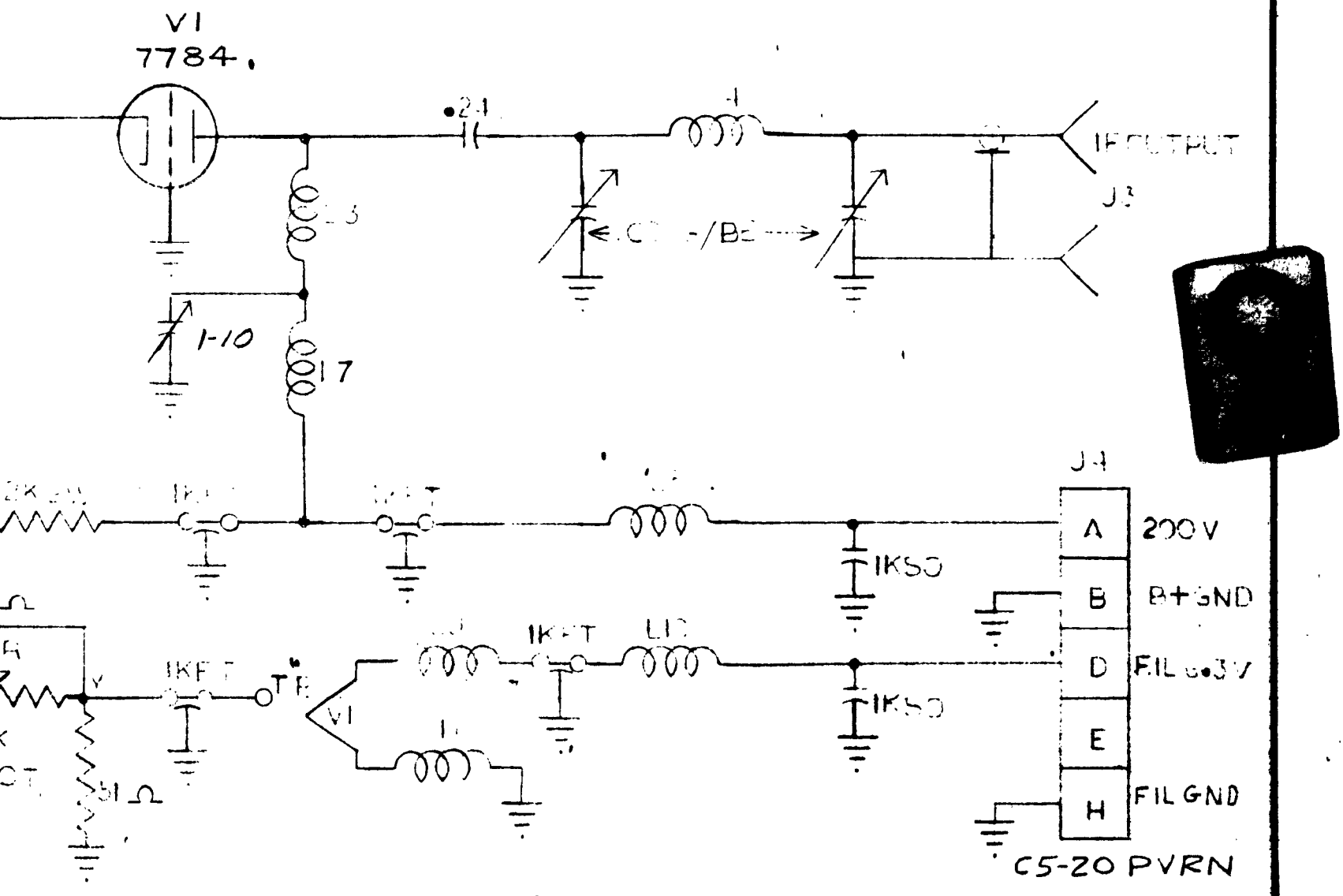
ALL DIMENSIONS IN INCHES, U
OTHERWISE SPECIFIED TOLER.
FRACTIONS ± 1/64 ANGLES ±
DECIMALS .XX ± .010 .XXX ±

MATERIAL:

FINISH:

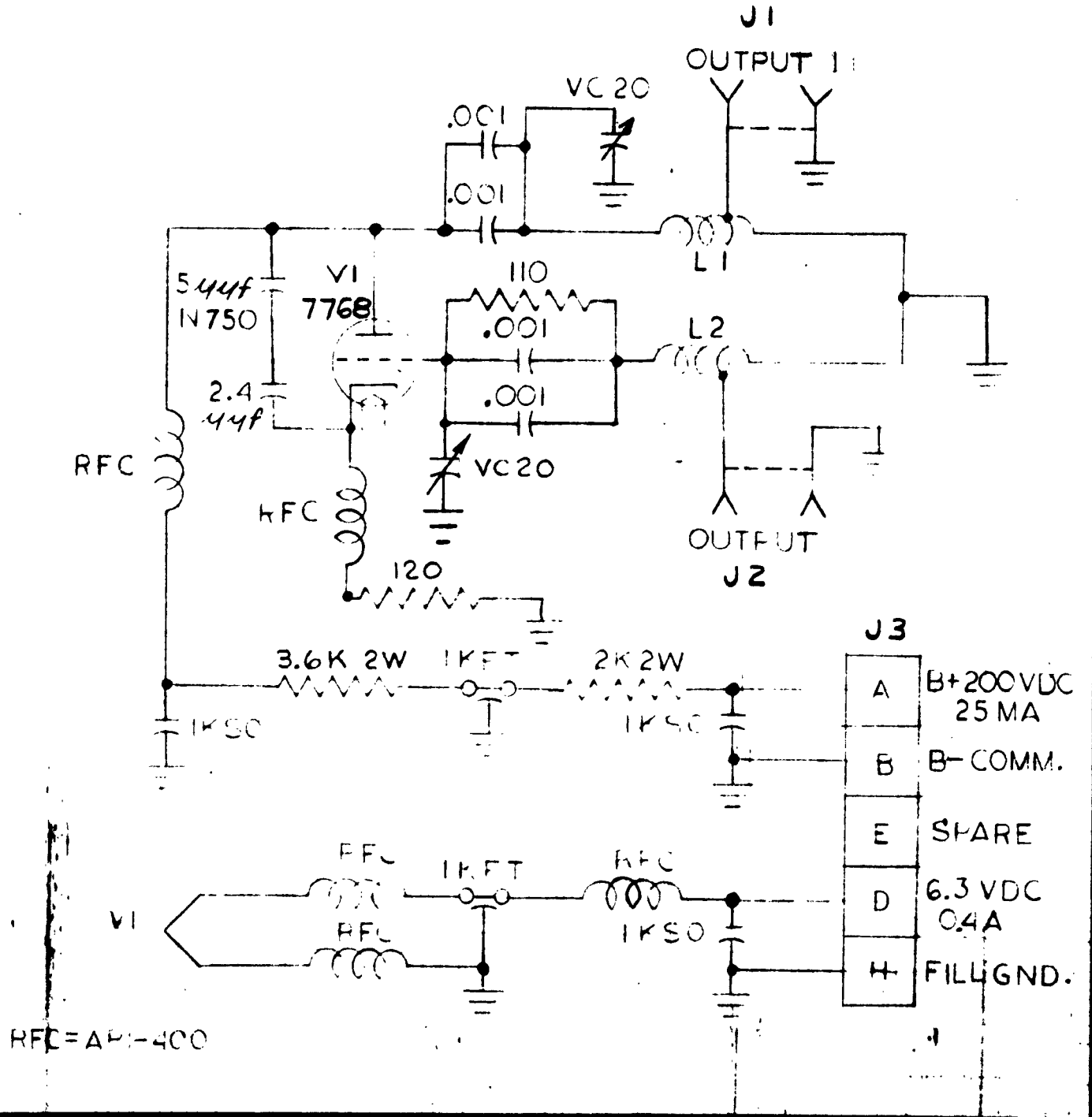
OGILVIE PRESS, INC., BROOKLYN 17, N. Y. ULTRAVEL NO. 490M

REVISIONS			
ISSUE	DESCRIPTION	DATE	BY



DIMENSIONS IN INCHES, UNLESS OTHERWISE SPECIFIED TOLERANCES: FRACTIONS ± 1/64 ANGLES ± 1/2° .XX ± .010 .XXX ± .005	DRAWN 6-7-62	SCHEMATIC CONVERTER 30MC/175MC UNIT 1A7A14	APPLIED RESEARCH INC. PORT WASHINGTON NEW YORK
MATERIAL:	DRAWN BY W.M.M.		
	CHECKED		
	APPROVED		DWG. SIZE B — 600814
	APPROVED	SCALE — UNIT WT.	ISSUE A

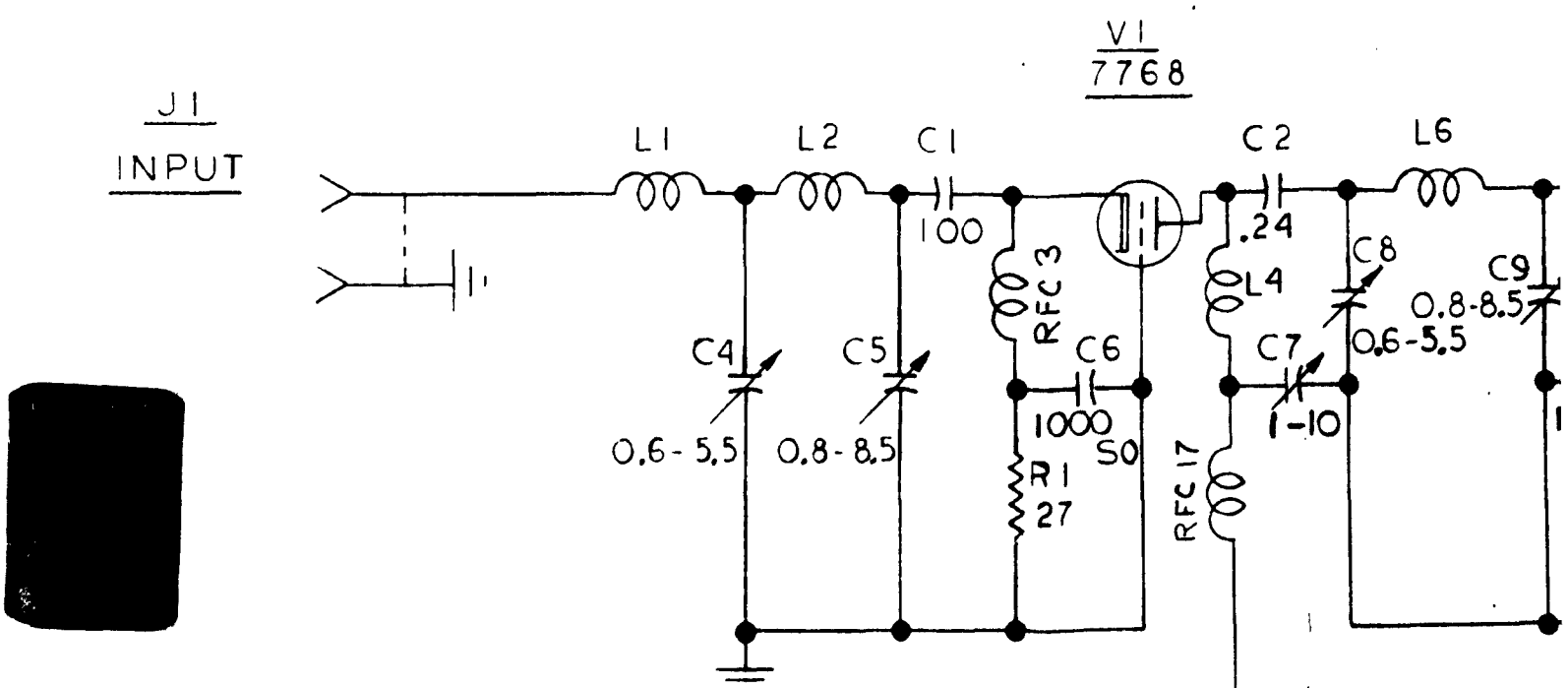
Fig 3

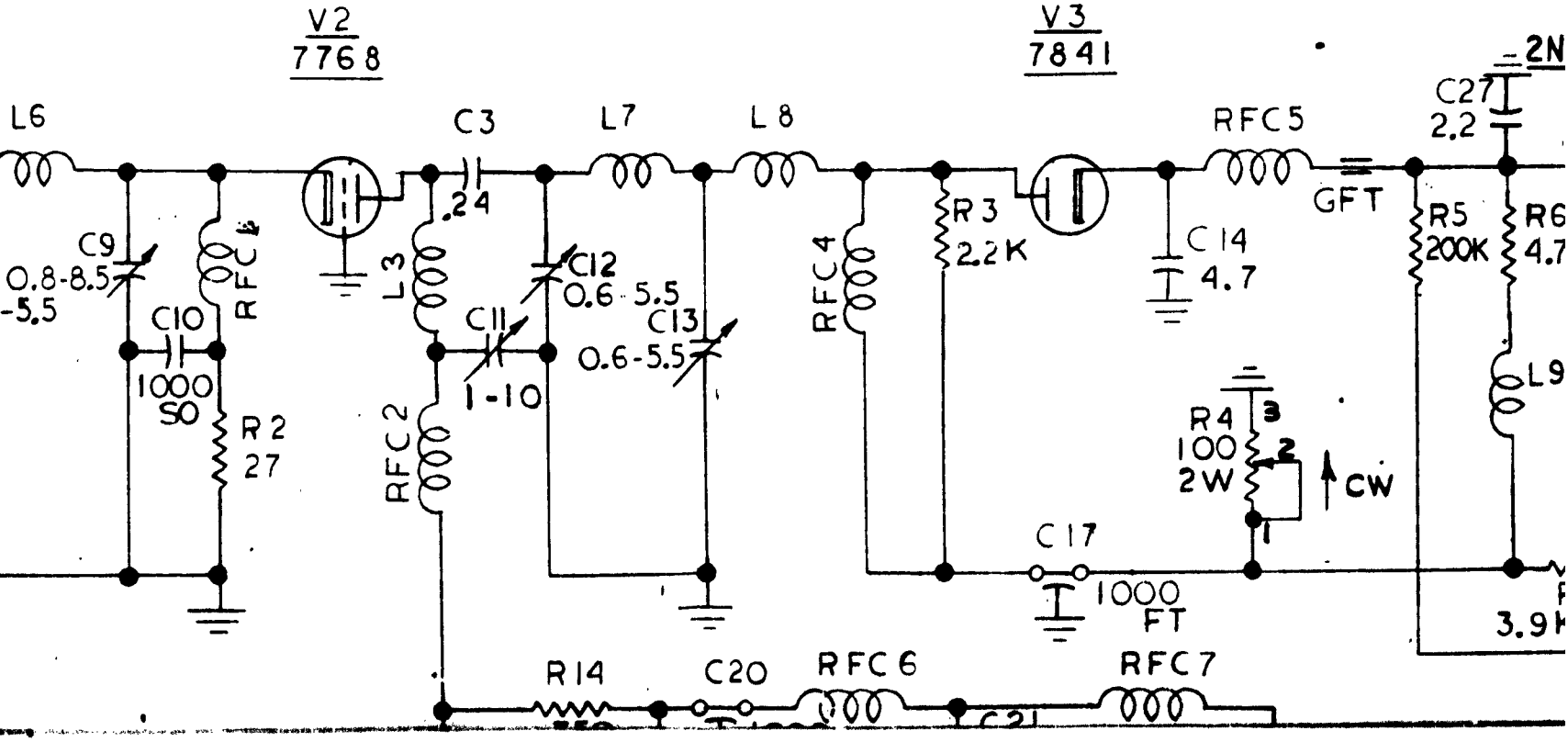


ALL DIMENSIONS IN INCHES. UNLESS OTHERWISE SPECIFIED TOLERANCES: FRACTIONS ± 1/64 ANGLES ± 1/2° DECIMALS .XX ± .010 .XXX ± .005	SCHEMATIC STRIP LINE LOCAL OSCILLATOR UNIT 1A7A13	APPLIED RESEARCH INC. PORT WASHINGTON NEW YORK
MATERIAL:		
FINISH:	JOB NO. 491-01 / DRAWN JML / SCALE	DWG SIZE A — 600812 — ISSUE C

OGILVIE PRESS, INC., BROOKLYN 17, N. Y. ULTRAVEL NO. 490M

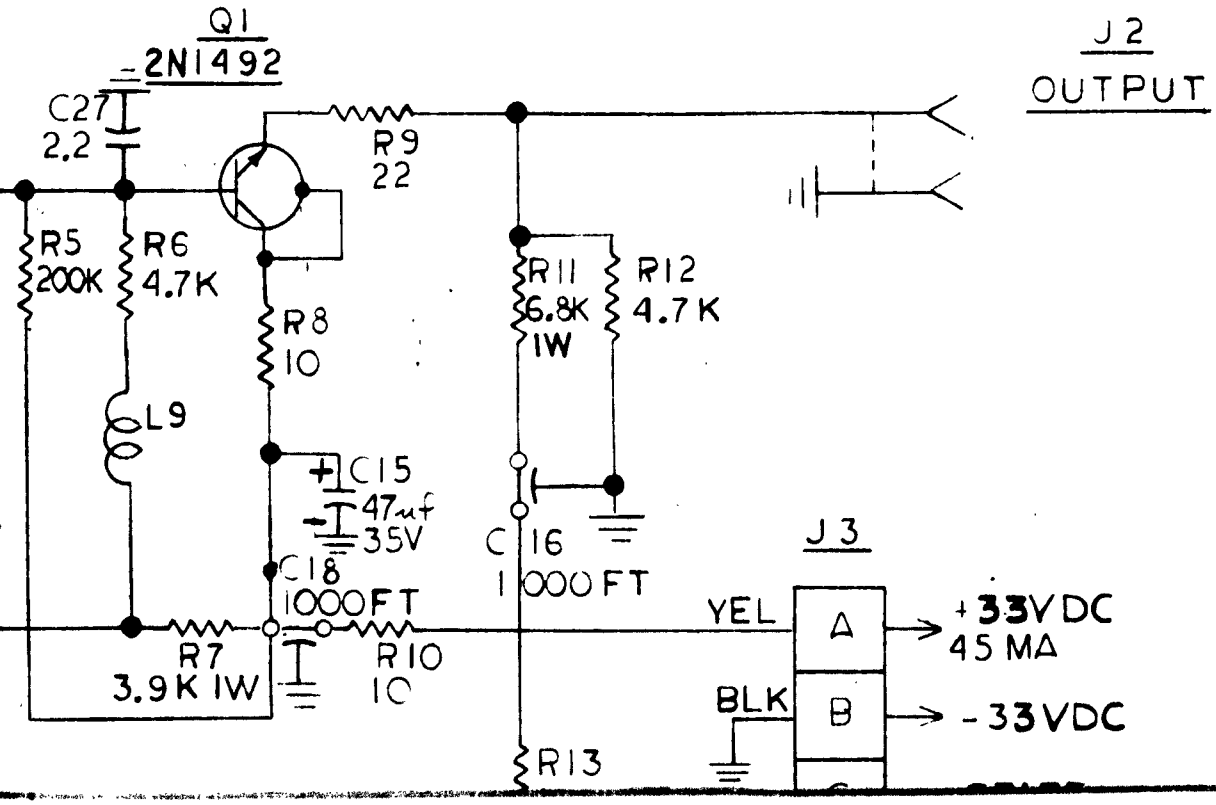
Fig 4


J1
INPUT
V1
7768
L1
L2
C1
100
C2
.24
L6
C8
0.6-5.5
C9
0.8-8.5
L4
RFC 3
C4
0.6-5.5
C5
0.8-8.5
C6
1000
S0
R1
27
C7
1-10
RFC 17


V2
7768
V3
7841
L6
C3
L7
L8
RFC5
C27
2.2
GFT
C9
0.8-8.5
-5.5
C10
1000
SO
RFC1
L3
.24
C12
0.6-5.5
C11
1-10
C13
0.6-5.5
RFC2
R2
27
RFC4
R3
2.2K
C14
4.7
R5
200K
R6
4.7
L9
R4
100
2W
CW
C17
1000
FT
3.9K
R14
C20
RFC6
RFC7

ISSUE	
B	EL

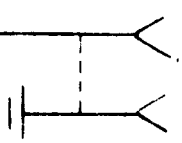
3


Q1
2N1492
C27
2.2
R9
22
J2
OUTPUT
R5
200K
R6
4.7K
R8
10
L9
R11
6.8K
1W
R12
4.7K
C15
47uf
35V
C16
1000FT
C18
1000FT
J3
YEL
A
+33VDC
45 MA
R7
3.9K 1W
R10
10
BLK
B
-33VDC
R13

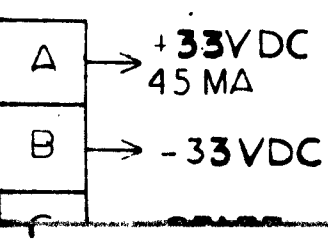
REVISIONS			
ISSUE	DESCRIPTION	DATE	BY
B	ELECTRICALLY REVISED	11-9-62	R.D.

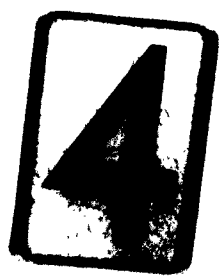
J 2

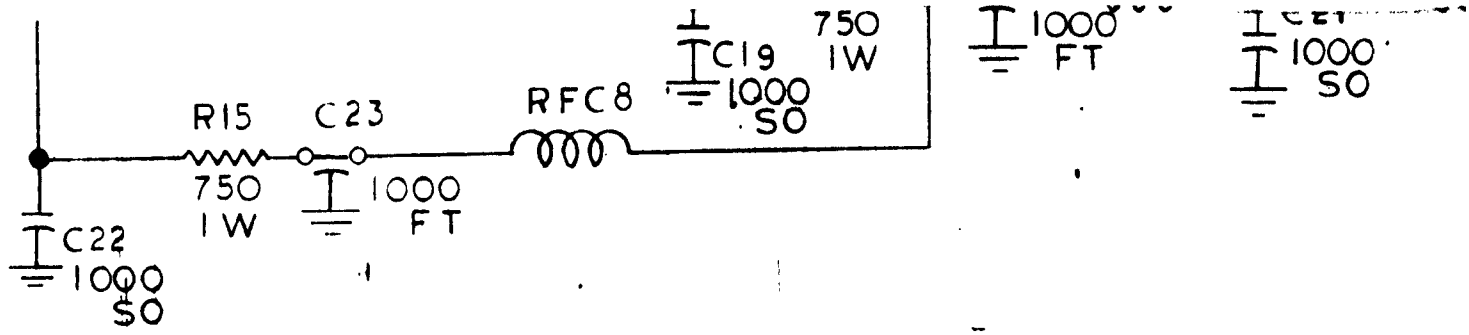
OUTPUT

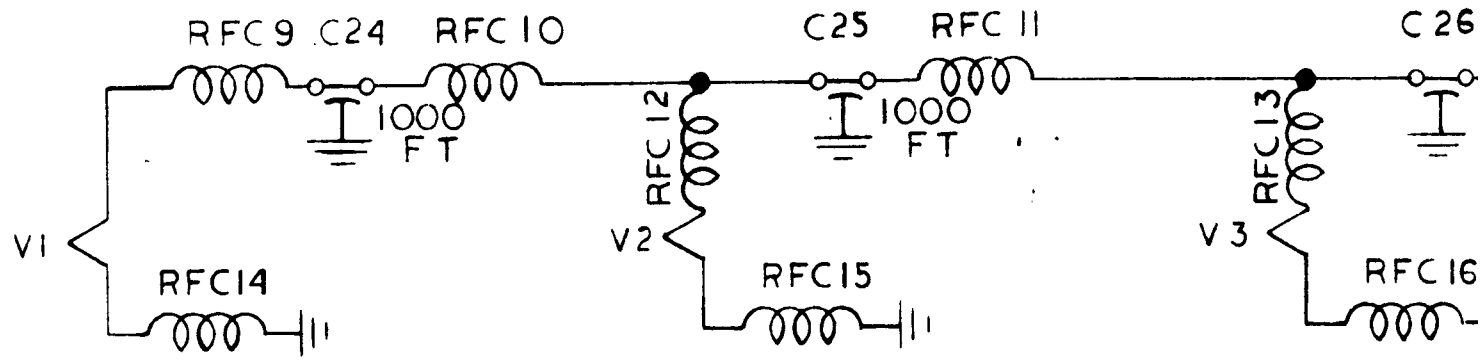


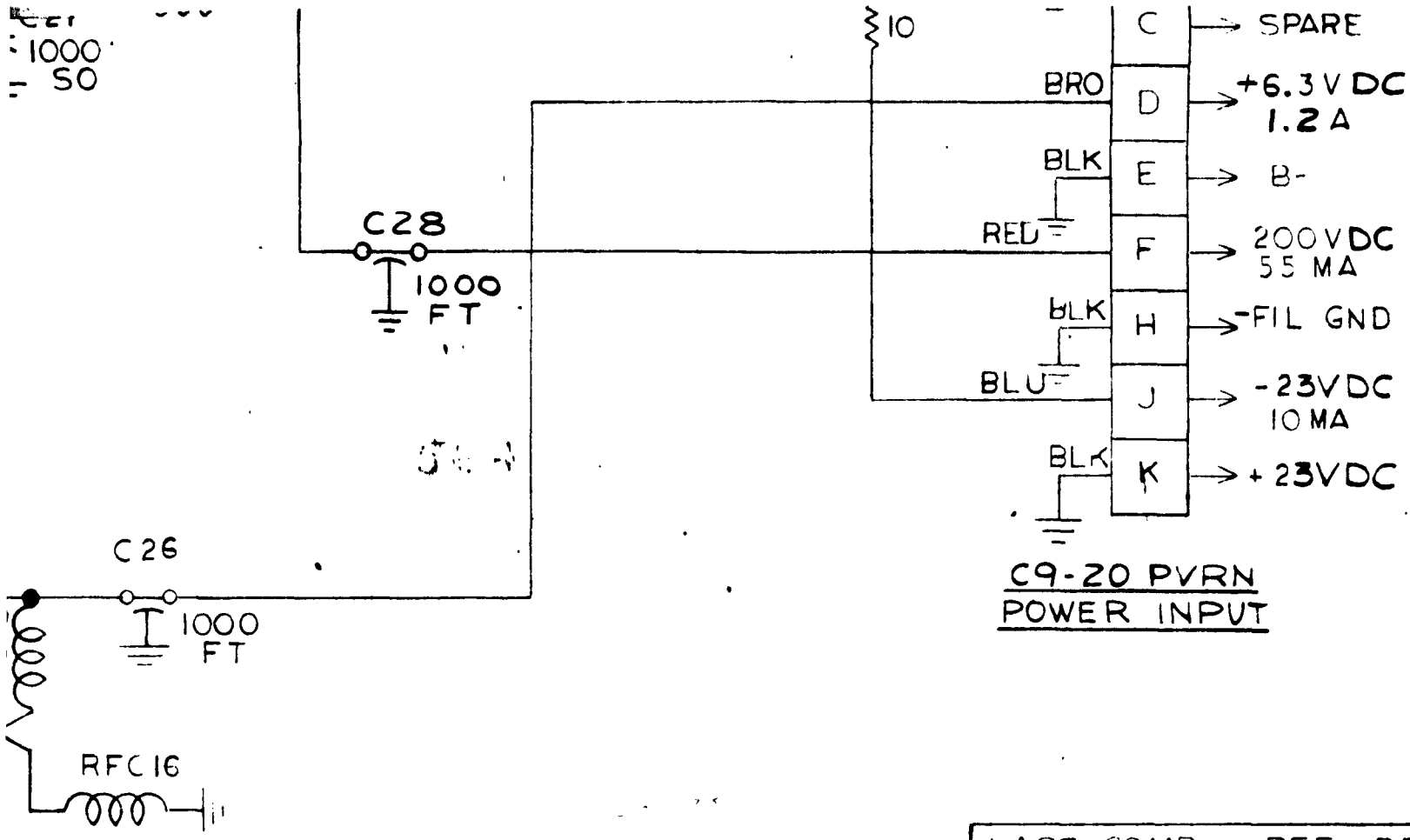
J 3






750
1W
C19
1000
SO
1000
FT
1000
SO
R15
750
1W
C23
1000
FT
RFC8
C22
1000
SO


RFC9
C24
RFC10
1000
FT
C25
RFC11
1000
FT
C26
RFC12
RFC13
V1
V2
V3
RFC14
RFC15
RFC16



C9-20 PVRN
POWER INPUT

LAST COMP			REF DESIG			
C	J	L	Q	R	RFC	V
28	3	9	1	15	17	3

6

491-01	501580
JOB NO.	NEXT ASSEMBLY
APPLICATION	

ALL DIMENSIONS IN INCHES, UNLESS OTHERWISE SPECIFIED TOLERANCES:
FRACTIONS ± 1/64 ANGLES ± 1/2°
DECIMALS .XX ± .010 .XXX ± .005

MATERIAL:

FINISH:

C	→ SPARE
D	→ +6.3 V DC 1.2 A
E	→ B-
F	→ 200 V DC 55 MA
H	→ -FIL GND
J	→ -23 V DC 10 MA
K	→ +23 V DC

O PVRN
R INPUT

COMP		REF DESIG		
L	Q	R	RFC	V
9	1	15	17	3

NOTE
1- UNLESS OTHERWISE NOTED
ALL CAPACITORS IN UUF
ALL RFC = ARI 800
ALL RESISTORS ARE 1/2W

7

600802 ISSUE B

ALL DIMENSIONS IN INCHES, UNLESS OTHERWISE SPECIFIED TOLERANCES:
FRACTIONS ± 1/64 ANGLES ± 1/2°
DECIMALS .XX ± .010 .XXX ± .005

MATERIAL:

FINISH:

DRAWN 5-24-62
DRAWN BY Brown
CHECKED
APPROVED
APPROVED

SCHEMATIC
POWER AMPLIFIER
DETECTOR
UNIT 1A7A8

SCALE
UNIT WT.

APPLIED RESEARCH INC.
PORT WASHINGTON
NEW YORK

DWG. SIZE D
600802
ISSUE B

Fig. 5

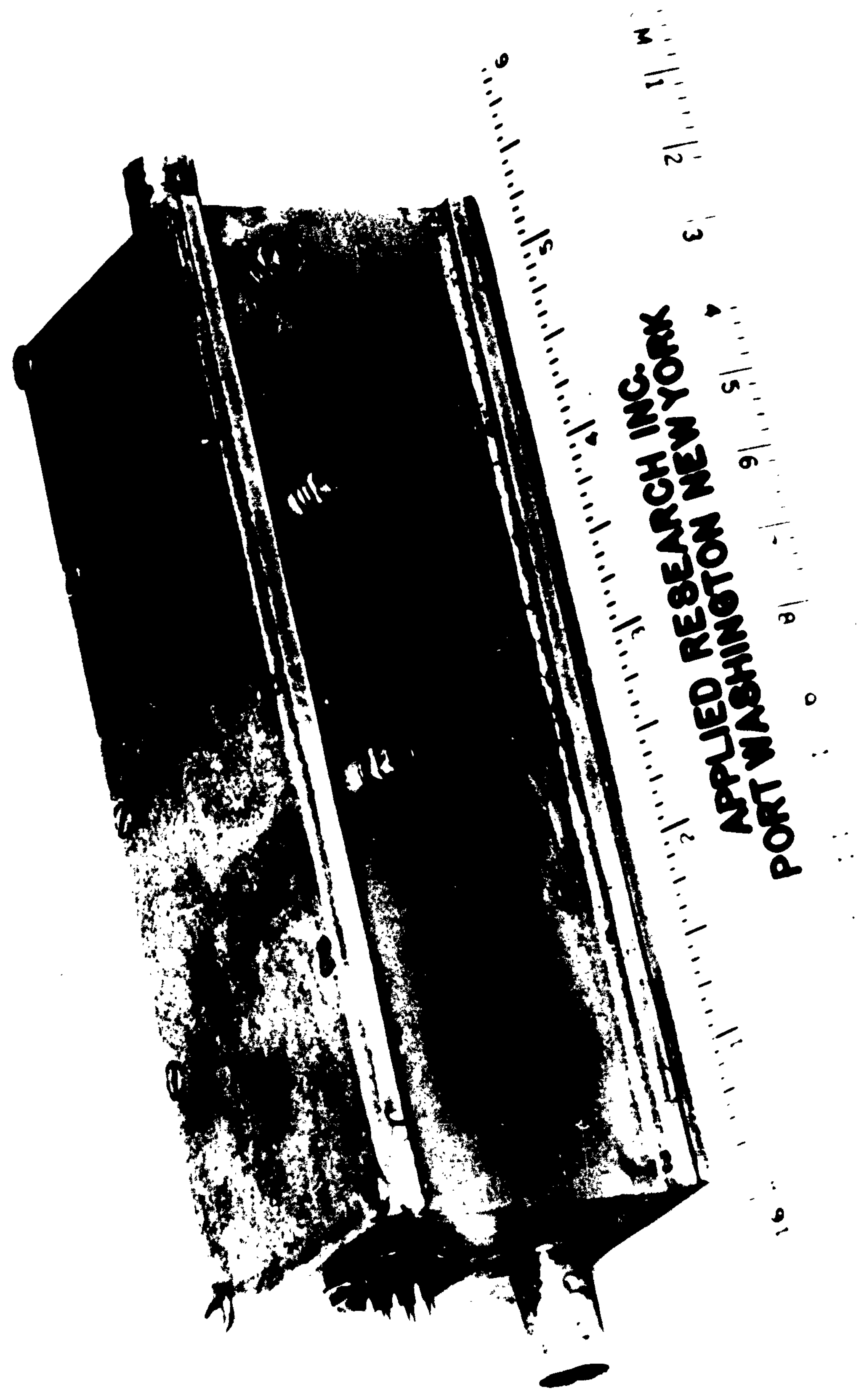


FIG. 6

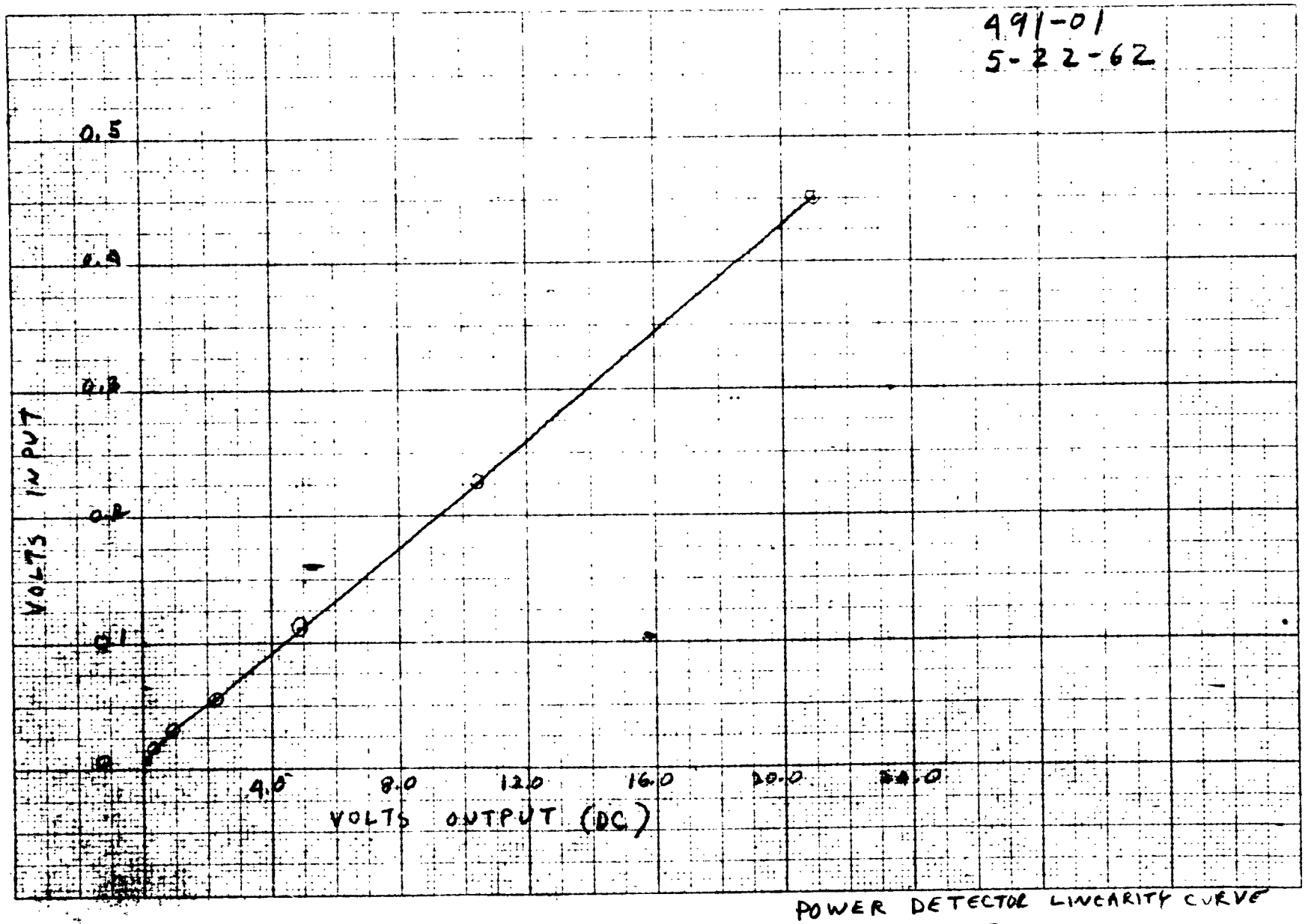
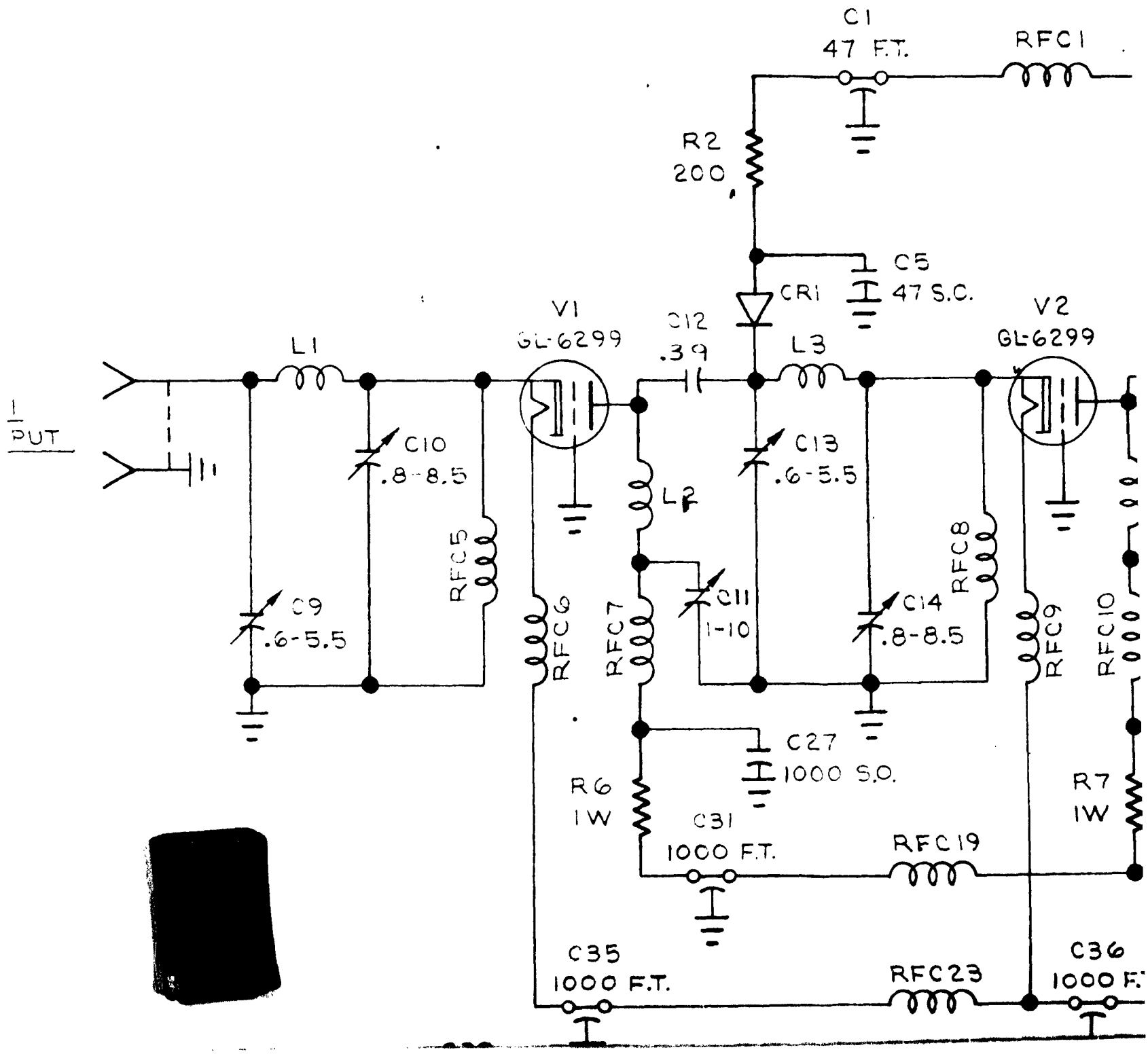
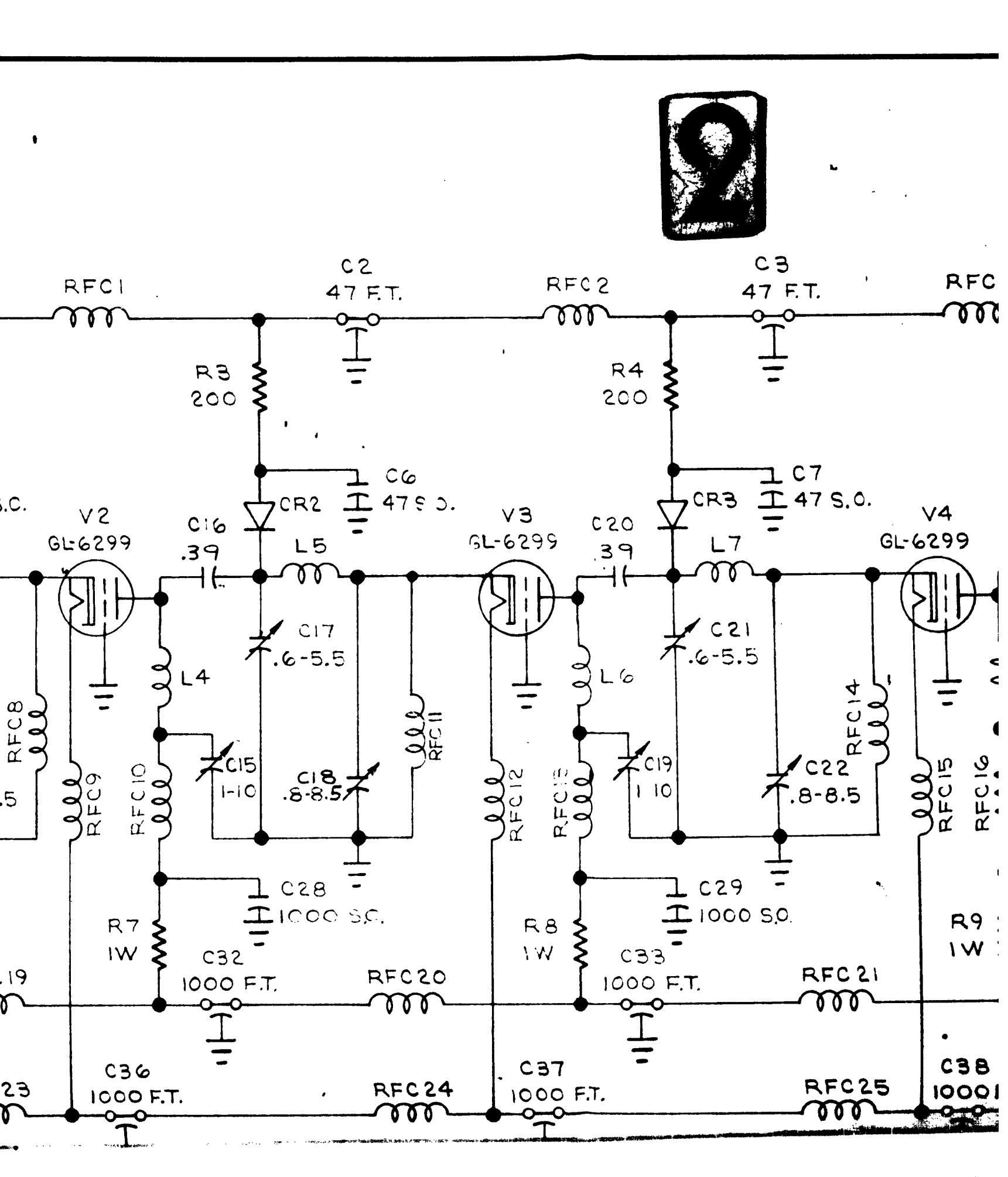
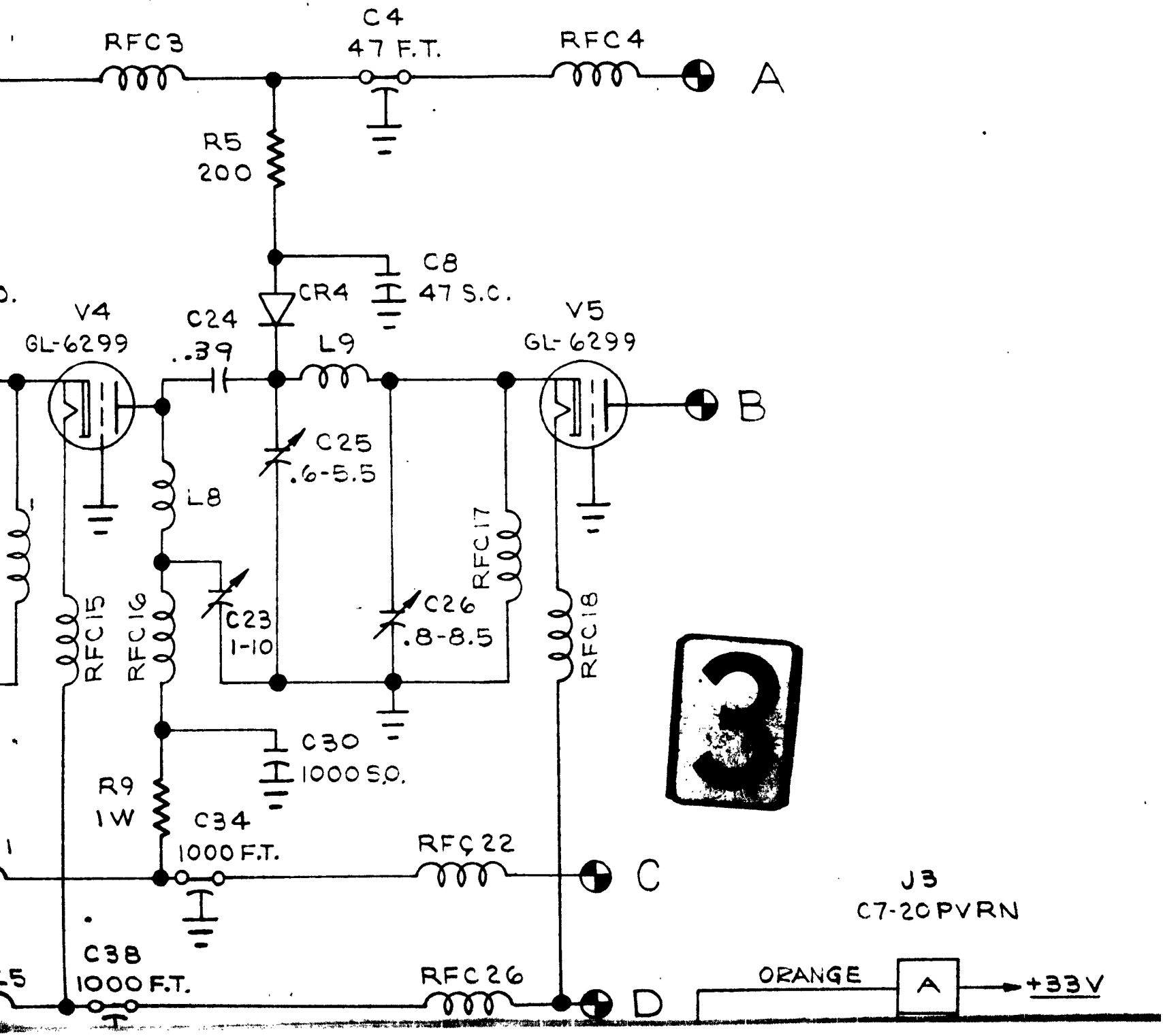


FIG 7 POWER DETECTOR LINEARITY CURVE


C1
47 F.T.
RFC1
R2
200
C5
47 S.C.
CR1
V1
GL-6299
C12
.39
L3
V2
GL-6299
L1
C10
.8-8.5
C13
.6-5.5
L2
C9
.6-5.5
RFC5
RFC6
RFC7
C11
1-10
C14
.8-8.5
RFC8
RFC9
RFC10
C27
1000 S.O.
R6
1W
R7
1W
C31
1000 F.T.
RFC19
C35
1000 F.T.
RFC23
C36
1000 F.T.


RFC1
C2
47 P.F.T.
RFC2
C3
47 P.F.T.
RFC
R3
200
R4
200
C6
47 S.C.
CR2
C7
47 S.C.
CR3
V2
GL-6299
V3
GL-6299
V4
GL-6299
C16
.39
C20
.39
L5
L7
C17
.6-5.5
C21
.6-5.5
L4
L6
C15
1-10
C18
.8-8.5
C19
1-10
C22
.8-8.5
RFC8
RFC9
RFC10
RFC11
RFC12
RFC13
RFC14
RFC15
RFC16
C28
1000 S.C.
C29
1000 S.C.
R7
1W
R8
1W
R9
1W
C32
1000 P.F.T.
C33
1000 P.F.T.
RFC20
RFC21
C36
1000 P.F.T.
C37
1000 P.F.T.
C38
1000
RFC24
RFC25


RFC3
C4
47 F.T.
RFC4
A
R5
200
C8
47 S.C.
CR4
V4
GL-6299
C24
.39
L9
V5
GL-6299
B
C25
.6-5.5
L8
RFC17
RFC15
RFC16
C23
1-10
C26
.8-8.5
RFC18
C30
1000 S.D.
R9
1W
C34
1000 F.T.
RFC22
C
J3
C7-20PVRN
C38
1000 F.T.
RFC26
D
ORANGE
A
+33V

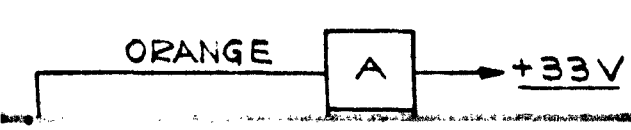
REVISIONS			
ISSUE	DESCRIPTION	DATE	BY
B	ELECTRICALLY REVISED	9-5-62	FP
C	ELECTRICALLY REVISED	10-19-62	FP
D	ELECTRICALLY REVISED	11-7-62	RD

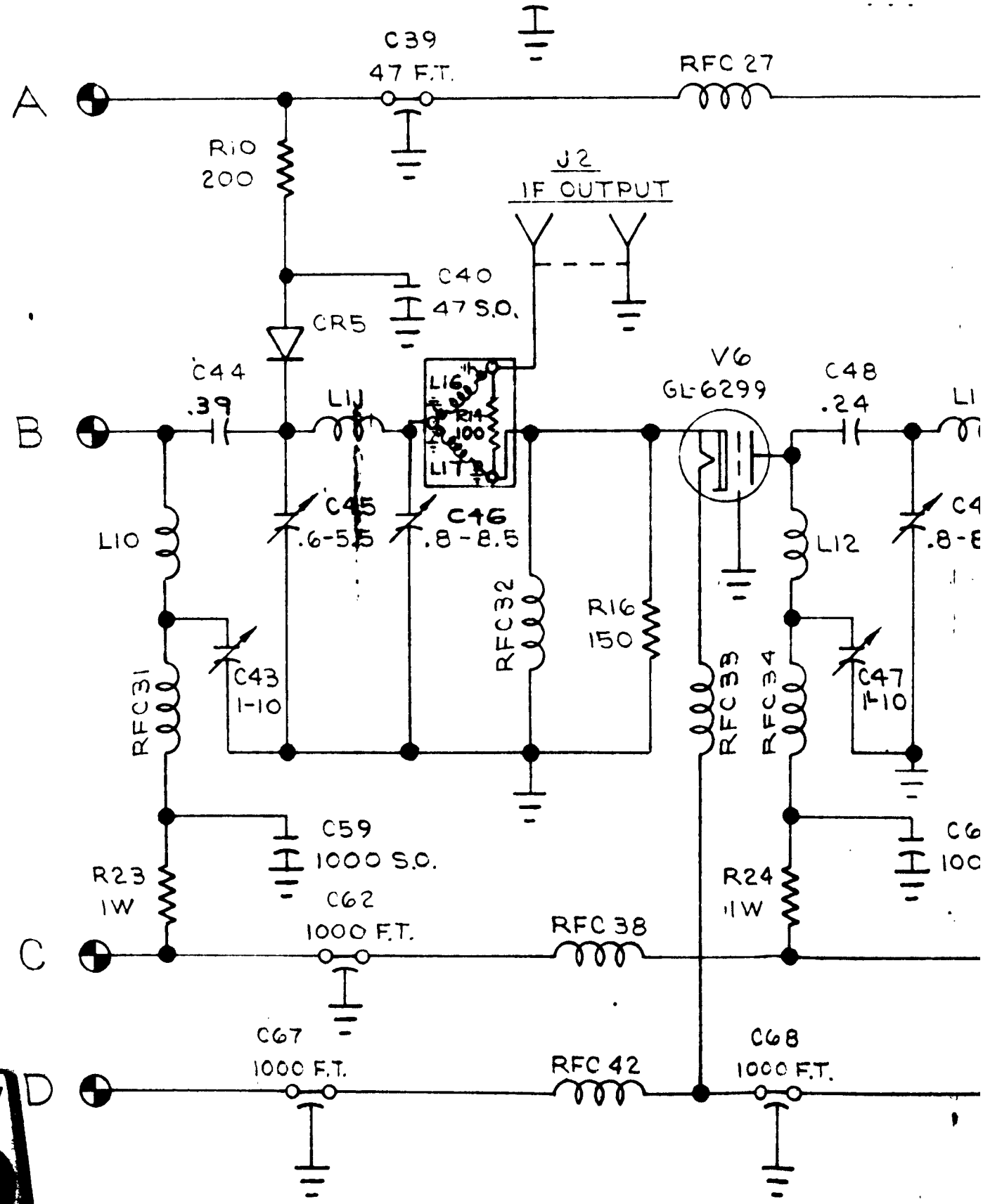
A

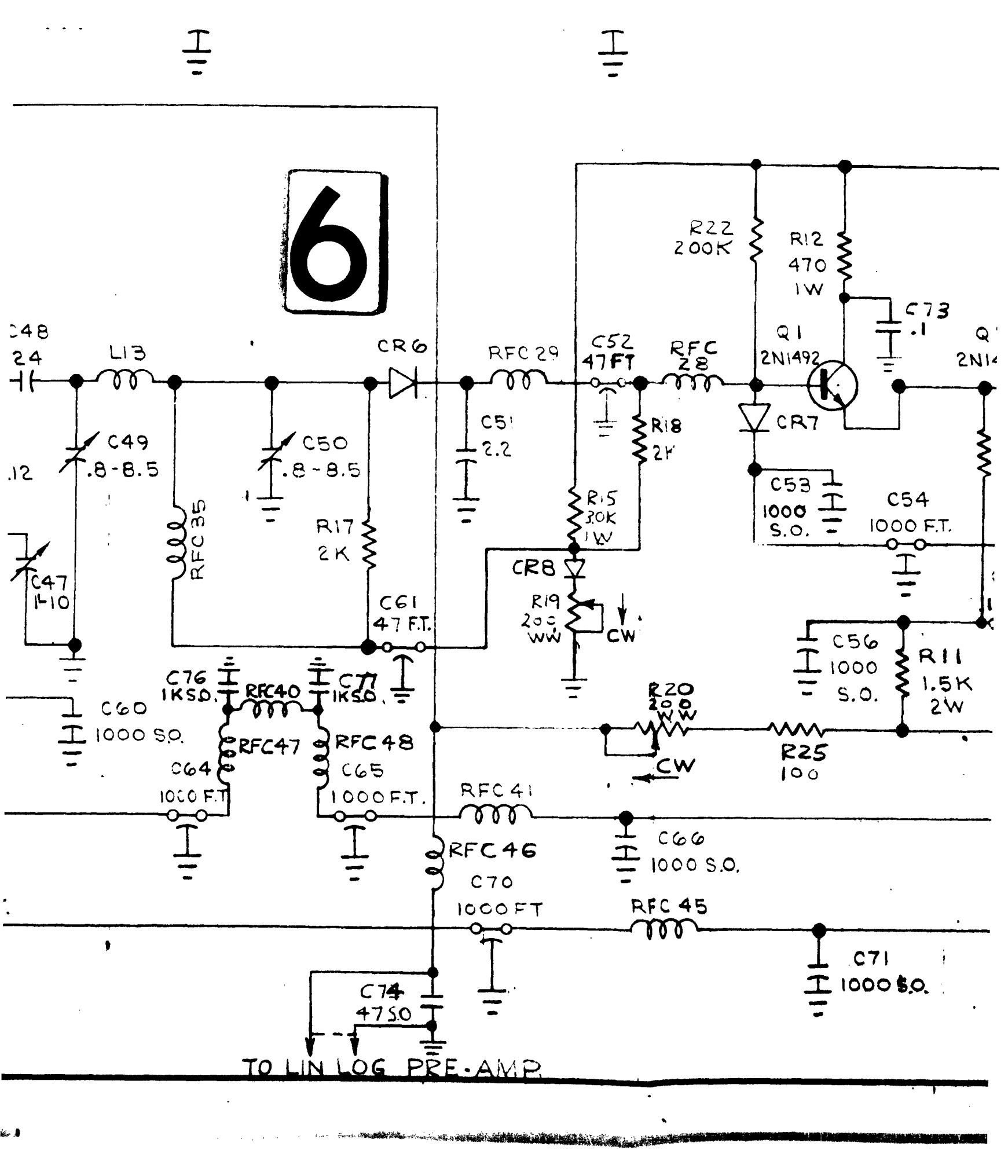
B

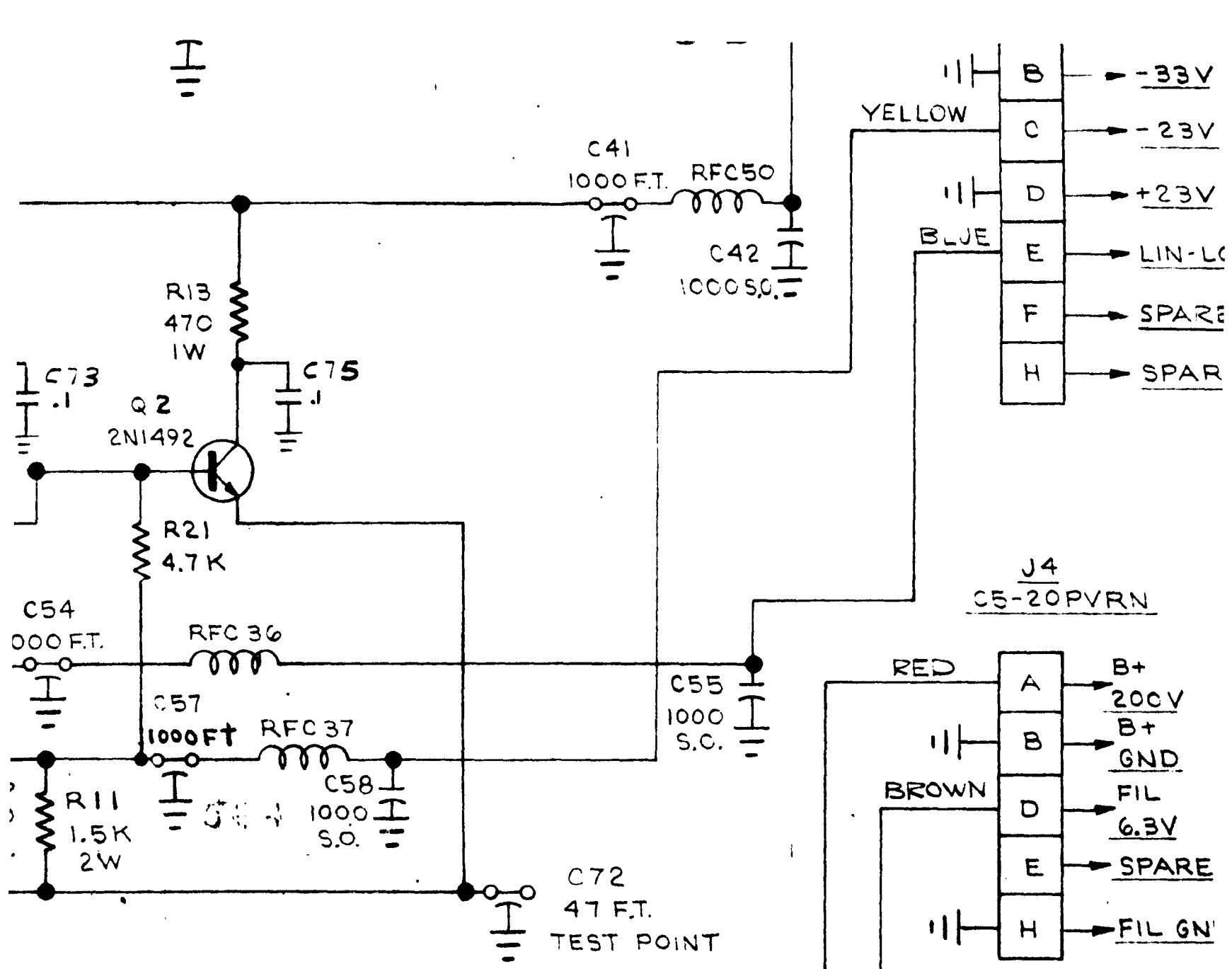
4

J3
C7-20PVRN






6
C48
24
L13
CR6
RFC 29
C52
47FT
RFC
28
R22
200K
R12
470
1W
C73
.1
Q1
2N1492
CR7
C49
.8-8.5
C50
.8-8.5
C51
2.2
R18
2K
R15
30K
1W
C53
1000
S.O.
C54
1000 F.T.
RFC 35
R17
2K
C47
1-10
CR8
R19
200
WW
CW
C61
47 F.T.
C56
1000
S.O.
R11
1.5K
2W
C76
1KS.O.
RFC40
C77
1KS.O.
C60
1000 S.O.
R20
200
WW
R25
100
CW
RFC47
RFC48
C64
1000 F.T.
C65
1000 F.T.
RFC 41
C66
1000 S.O.
RFC46
C70
1000 FT
RFC 45
C71
1000 S.O.
C74
47S.O.
TO LIN LOG PRE-AMP



71
DO S.O.

7

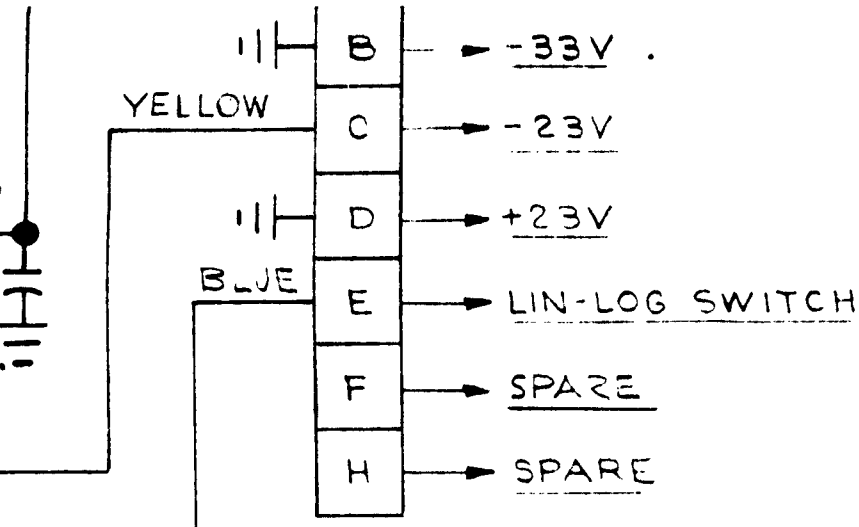
491-01	501783
JOB NO.	NEXT ASSEMBLY
APPLICATION	

ALL DIMENSIONS IN INCHES, UNLESS OTHERWISE SPECIFIED TOLERANCES:
FRACTIONS ± 1/64 ANGLES ± 1/2°
DECIMALS .XX ± .010 .XXX ± .005

MATERIAL: ~

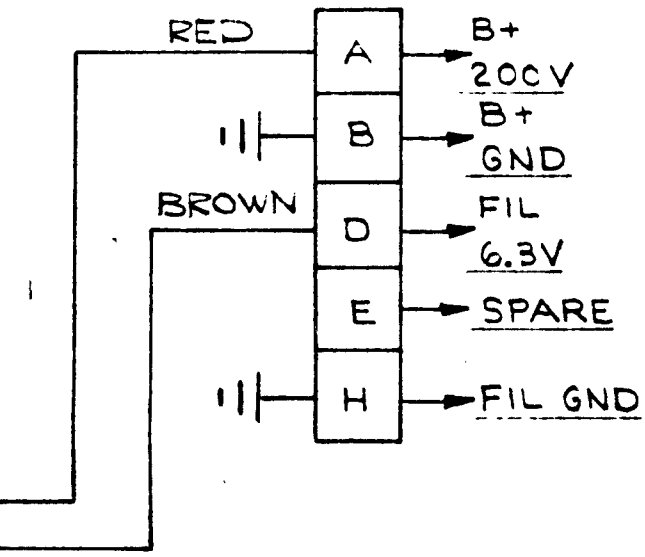
FINISH: ~

DRAWN	5-5-62
DRAWN BY	A. Hammond
CHECKED	
APPROVED	
APPROVED	



NOTE:
1. UNLESS OTHERWISE SPECIFIED
ALL CAPACITORS ARE IN μμf
ALL RESISTORS ARE 1/2 W

J4
C5-20PVRN



8

LAST COMPONENT DESIG							
C	CR	R	J	V	Q	L	RFC
77	8	25	4	6	2	18	50

ALL DIMENSIONS IN INCHES, UNLESS OTHERWISE SPECIFIED TOLERANCES:
FRACTIONS ± 1/64 ANGLES ± 1/2°
DECIMALS .XX ± .010 .XXX ± .005

MATERIAL: ~

FINISH: ~

DRAWN 5-5-62
DRAWN BY A Kennard
CHECKED
APPROVED
APPROVED

SCHEMATIC
LIN-LOG IF AMPL.
UNIT 1A7A7

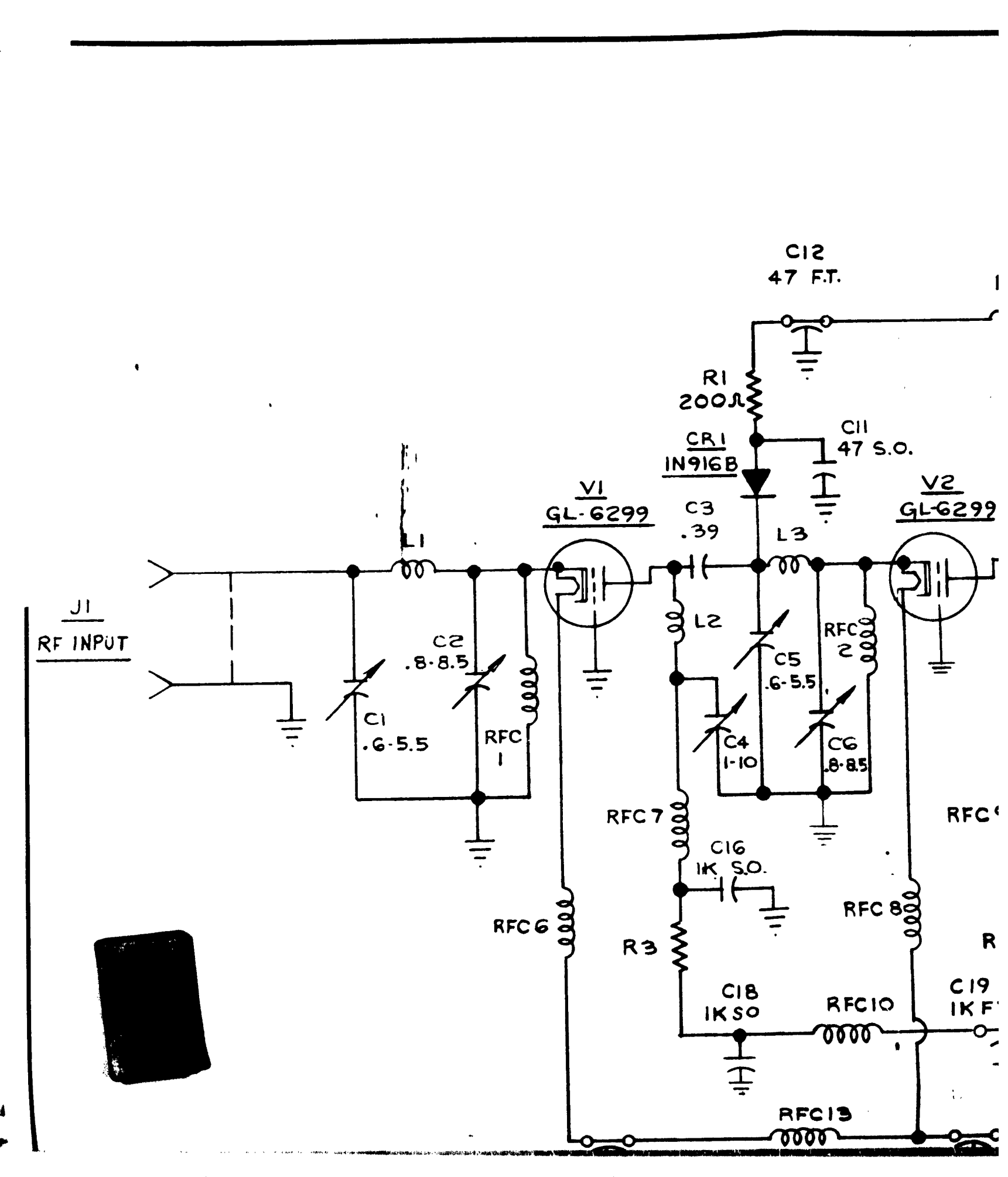
SCALE NONE UNIT WT.

APPLIED RESEARCH INC.
PORT WASHINGTON
NEW YORK

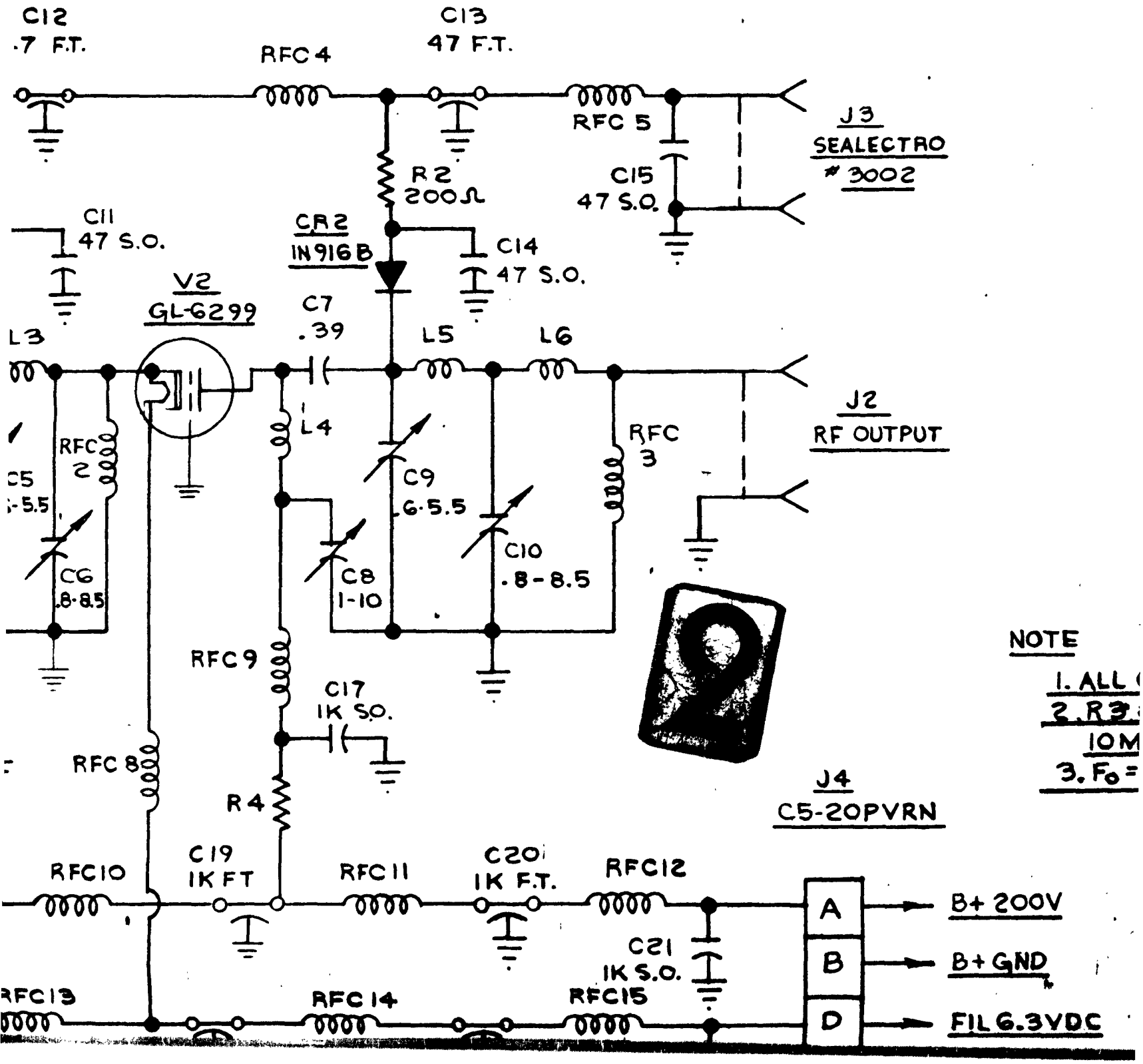
DWG. SIZE D
600806
ISSUE D

600806 ISSUE D

Fig 8


C12
47 P.T.
R1
200Ω
CR1
IN916B
C11
47 S.O.
V1
GL-6299
C3
.39
L3
V2
GL-6299
L1
J1
RF INPUT
L2
C2
.8-8.5
C5
.6-5.5
RFC
2
C1
.6-5.5
RFC
1
C4
1-10
C6
.8-8.5
RFC7
C16
1K S.O.
RFC6
RFC8
R3
C18
1K SO
RFC10
C19
RFC13

ISSUE	D
B	INTERCHAN

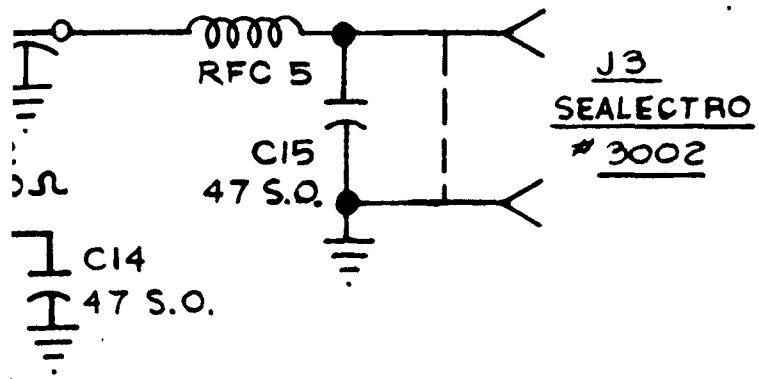


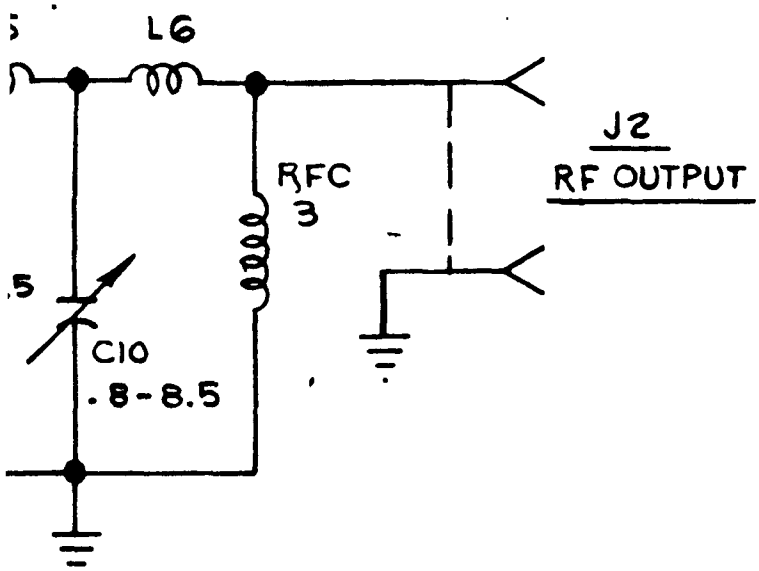
NOTE

1. ALL
2. R3
10M
3. F_o =

REVISIONS			
ISSUE	DESCRIPTION	DATE	BY
B	INTERCHANGE C18 WITH C19	10-16-62	MB

C13
7 F.T.



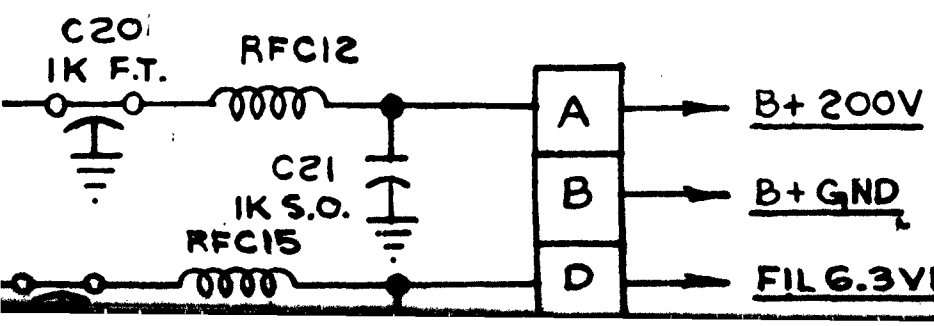


3

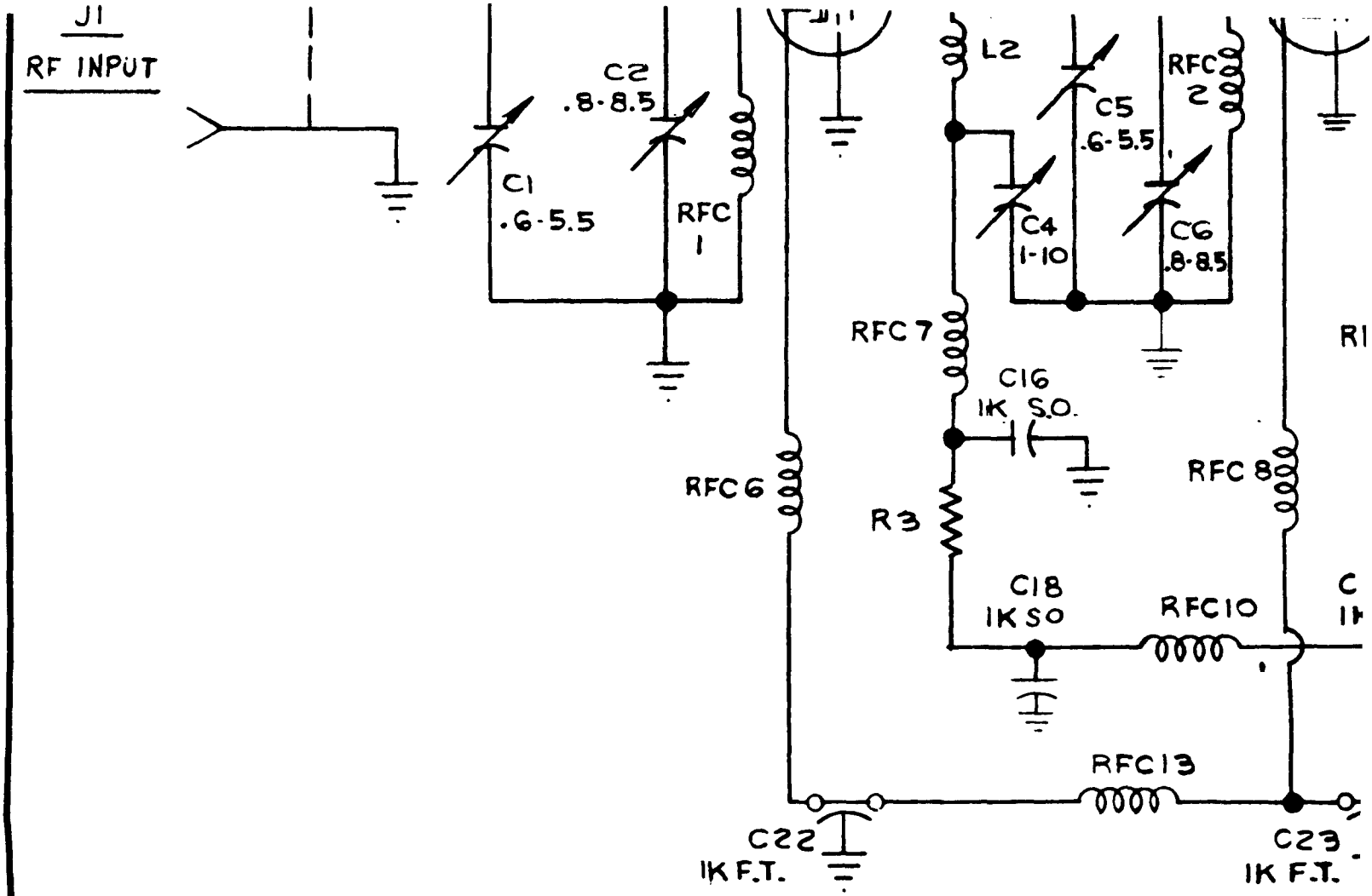
NOTE

1. ALL CAPACITORS IN mmf
2. R3 & R4 SELECTED FOR 10MA TUBE CURRENT
3. F_o = 775 MC

J4
C5-20PVRN

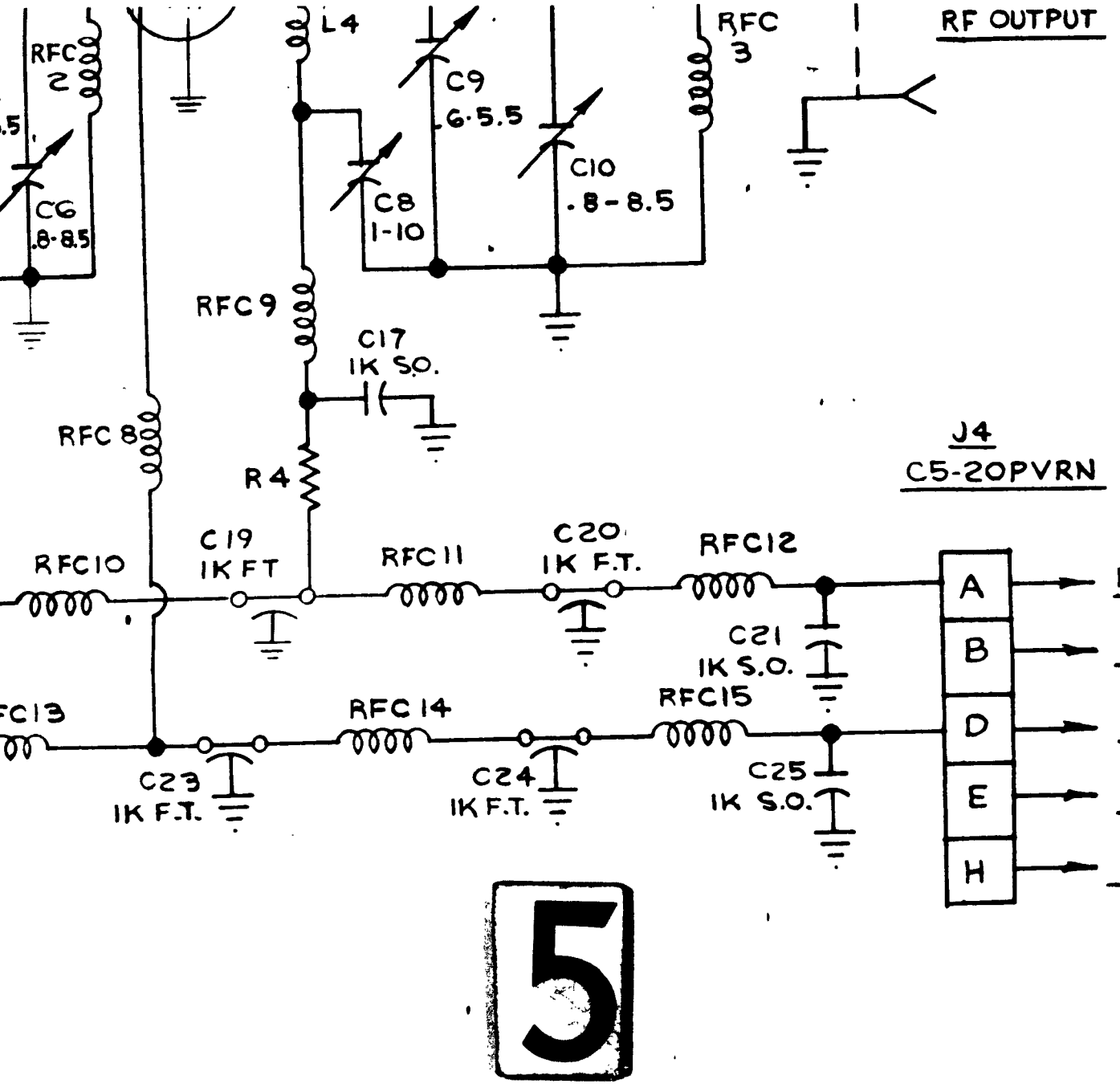


ISSUE B
600853



4

OGILVIE PRESS, INC., BROOKLYN 17, N. Y. ULTRAVEL NO. 490M

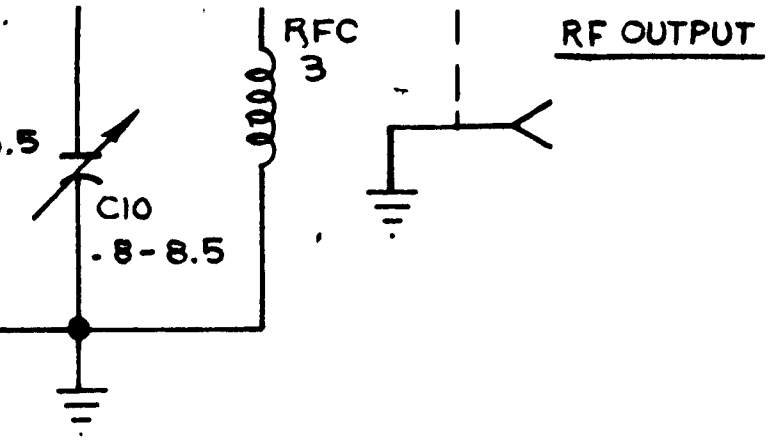


NOTE

1. ALL CA
2. R3 &
10MA
3. F_o = 7

5

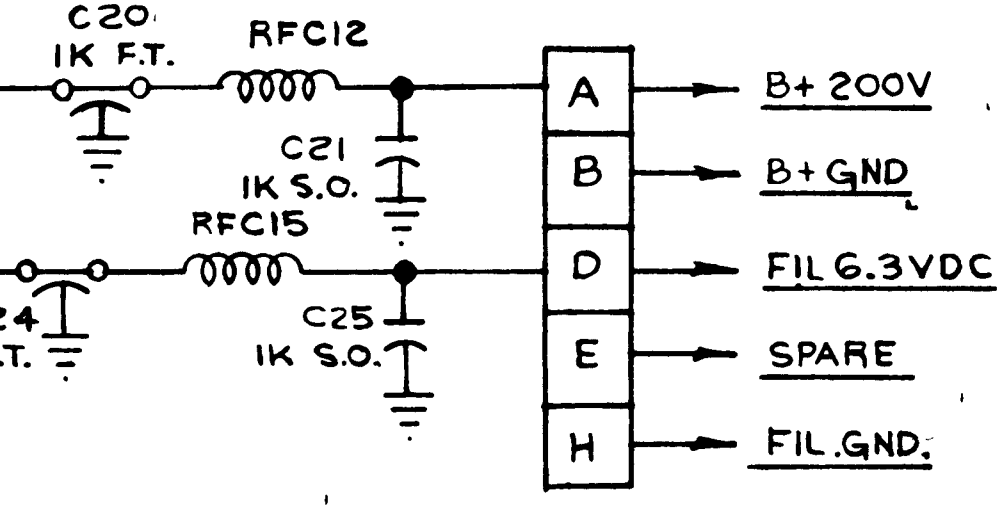
		ALL DIMENSIONS IN INCHES, UNLESS OTHERWISE SPECIFIED TOLERANCES: FRACTIONS ± 1/64 ANGLES ± 1/2° DECIMALS .XX ± .010 .XXX ± .005	DRAWN 8-14-62	SCHEMATIC
			DRAWN BY M.MERBER	E-2(A)775/6 LIN-LO
		MATERIAL:	CHECKED	PRE-AMPLIFIE
491-01	501677	FINISH:	APPROVED	UNIT 1A7A17
JOB NO.	NEXT ASSEMBLY		APPROVED	SCALE — UNIT WT. —
APPLICATION				



NOTE

1. ALL CAPACITORS IN mmf
2. R3 & R4 SELECTED FOR 10MA TUBE CURRENT
3. F_o = 775 MC

J4
C5-20PVRN



6

ALL DIMENSIONS IN INCHES, UNLESS OTHERWISE SPECIFIED TOLERANCES: FRACTIONS ± 1/64 ANGLES ± 1/2° DECIMALS .XX ± .010 .XXX ± .005	DRAWN 8-14-62	SCHEMATIC E-2(A)775/6 LIN-LOG IF PRE-AMPLIFIER UNIT 1A7A17	APPLIED RESEARCH INC. PORT WASHINGTON NEW YORK
MATERIAL:	DRAWN BY M.MERBER		
	CHECKED		
FINISH:	APPROVED		DWG. SIZE C — 600853 — ISSUE B
	APPROVED	SCALE — UNIT WT. —	

600853 ISSUE B

FIG. 9

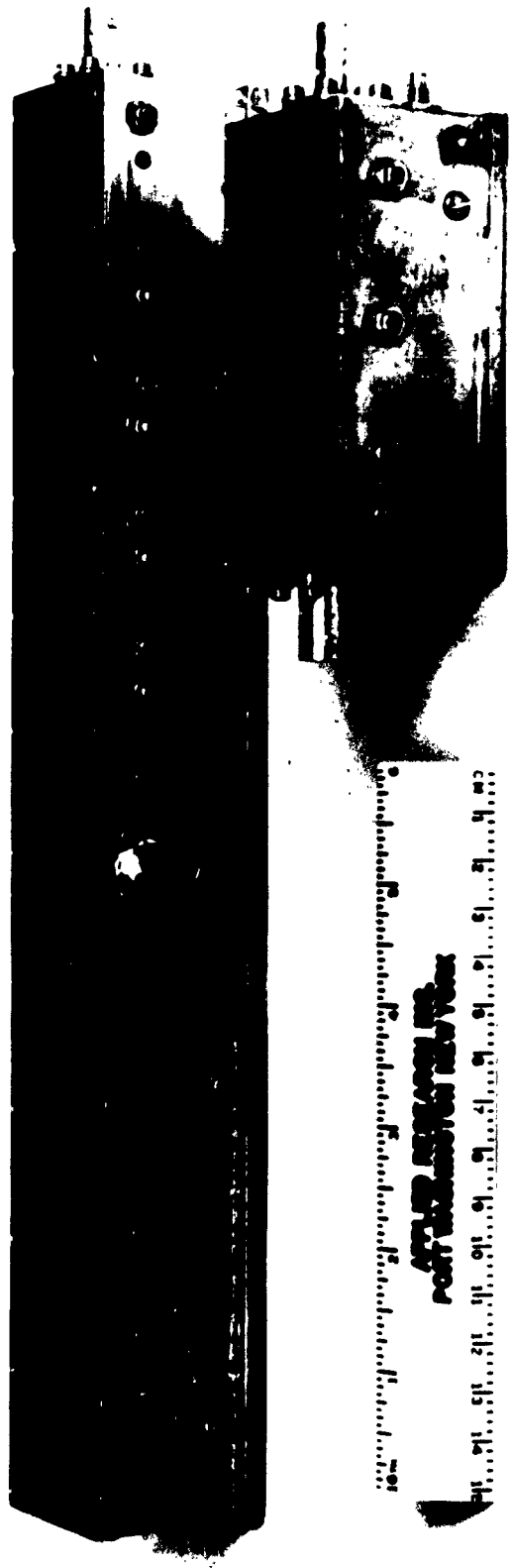


FIG. 10

NO. 340R-20 DIETZGEN GRAPH PAPER
20 X 20 PER INCH

EUGENE DIETZGEN CO
MADE IN U. S. A.

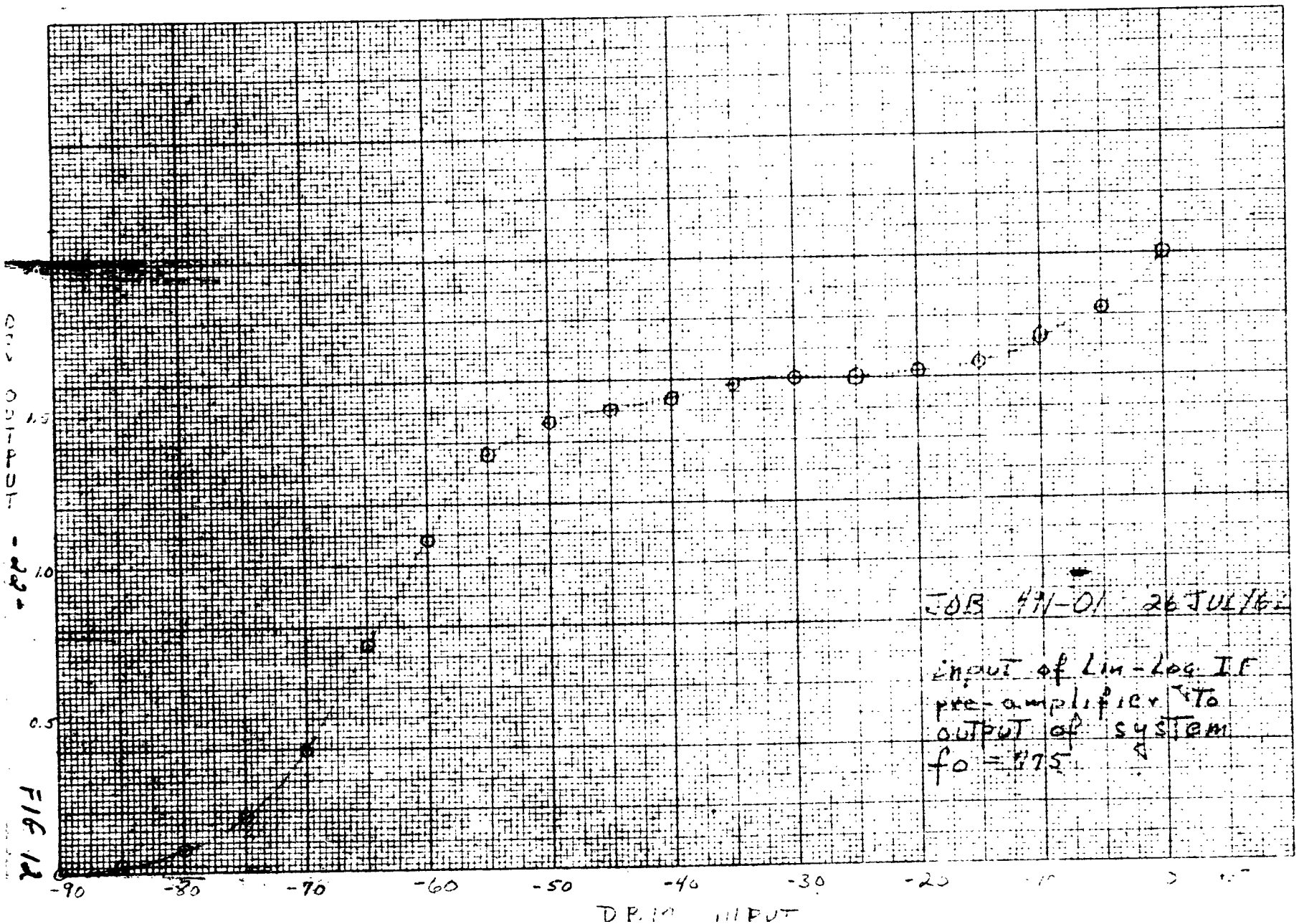


FIG 12

	FEB	MARCH	APRIL	MAY	JUN
1. ENGINEERING DEVELOPMENT					
2. MECHANICAL DESIGN					
3. FABRICATION					
4. FINAL TEST					

WORK COMPLETED

WORK TO BE COMPLETED

JOB NO.	NEXT ASSEMBLY
APPLICATION	

ALL DIMENSIONS IN INCHES, UNLESS OTHERWISE SPECIFIED TOLERANCES:
FRACTIONS ± 1/64 ANGLES ± 1/2°
DECIMALS .XX ± .010 .XXX ± .005

MATERIAL:

FINISH:

DRAW
6-21-
DRAWN
WILLIA
CHECKI
APPROV
APPROV

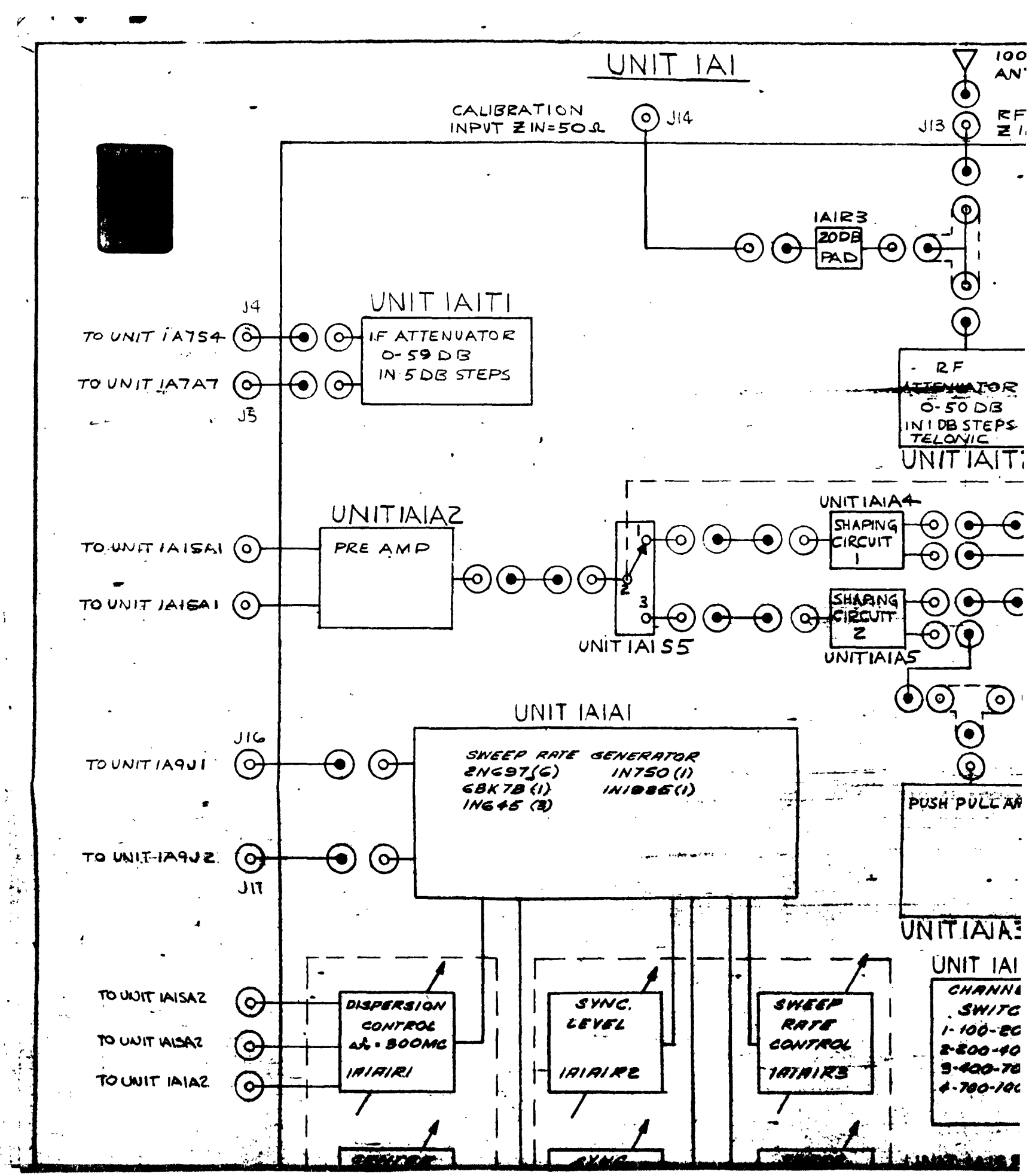
OGILVIE PRESS, INC., BROOKLYN 17, N. Y. ULTRAVEL NO. 490M

REVISIONS			
ISSUE	DESCRIPTION	DATE	BY

RCH	APRIL	MAY	JUNE	JULY	AUG	SEPT

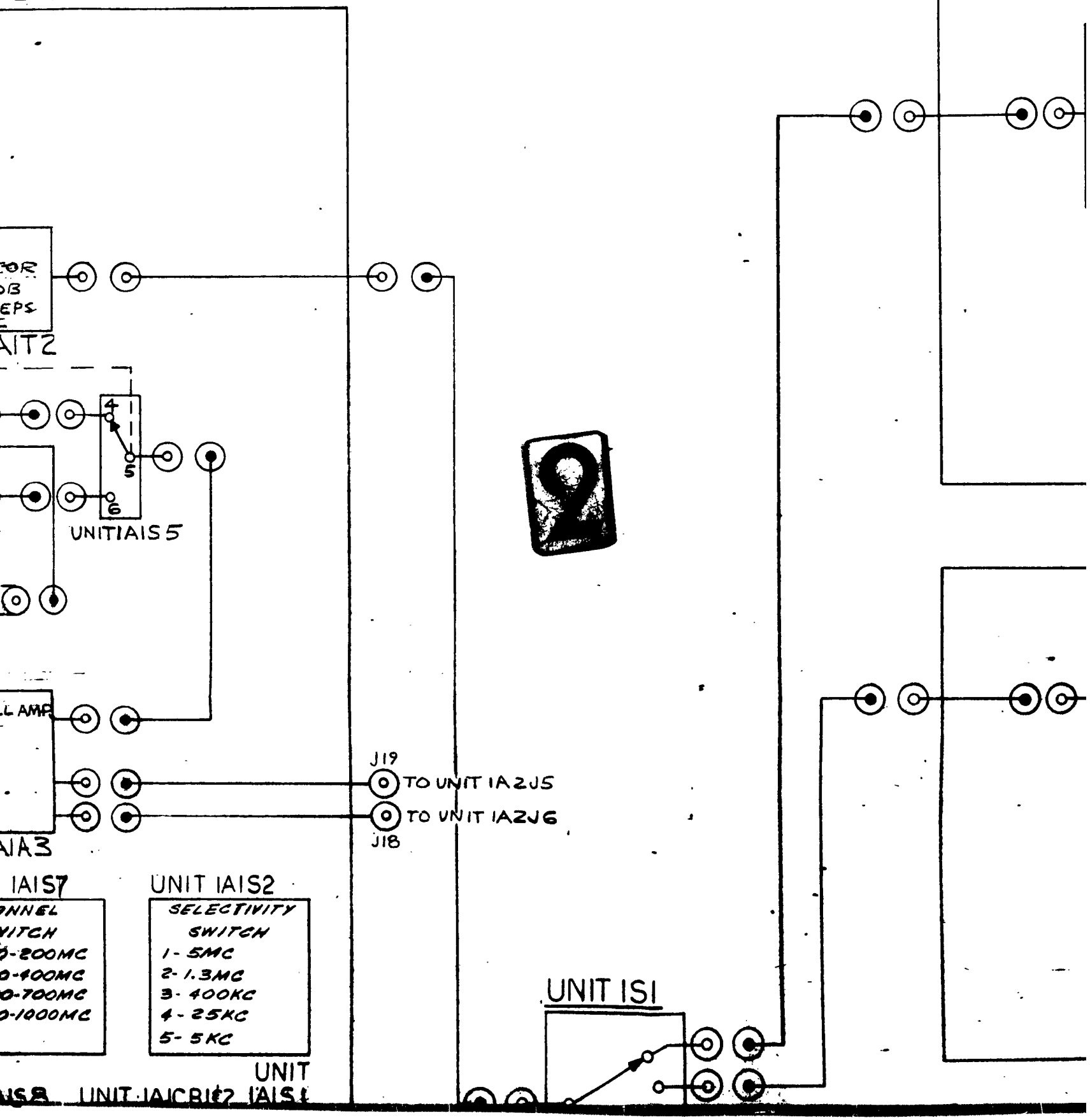
LL DIMENSIONS IN INCHES. UNLESS THERWISE SPECIFIED TOLERANCES: IACTIONS ± 1/64 ANGLES ± 1/2° ECIMALS .XX ± .010 .XXX ± 005	DRAWN 6-21-62	SPECTROSCOPE PROJECT PERFORMANCE AND SCHEDULE CHART	APPLIED RESEARCH INC. PORT WASHINGTON NEW YORK	
IATERIAL: — —	DRAWN BY WILLIAMS			
	CHECKED			
INISH:	APPROVED		DWG. SIZE B	SF-138
	APPROVED	SCALE — UNIT WT. —		ISSUE A

Fig. 3


UNIT IAI
CALIBRATION INPUT Z IN=50Ω
J14
J13
IAIR3
20DB PAD
UNIT IAITI
J4
TO UNIT IA7S4
TO UNIT IA7A7
J5
I.F ATTENUATOR 0-59 DB IN 5 DB STEPS
RF ATTENUATOR 0-50 DB IN 1 DB STEPS TELONIC
UNIT IAIA2
PRE AMP
TO UNIT IAISA1
TO UNIT IAISA1
UNIT IAIA4
SHAPING CIRCUIT 1
SHAPING CIRCUIT 2
UNIT IAIS5
UNIT IAIA5
UNIT IAIAI
J16
TO UNIT IA9J1
TO UNIT-IA9J2
J17
SWEEP RATE GENERATOR
2N697(6) IN750(1)
6BK7B(1) IN1086(1)
IN645 (3)
PUSH PULL AM
UNIT IAIA3
UNIT IAI
TO UNIT IAISA2
TO UNIT IAISA2
TO UNIT IAIA2
DISPERSION CONTROL Δf = 300MC IAIAIRI
SYNC. LEVEL IAIAIR2
SWEEP RATE CONTROL IAIAIR3
CHANNEL SWITCH
1-100-200
2-200-400
3-400-700
4-700-100

100-1000 MC
ANTENNA

RF INPUT
Z IN = 50Ω



UNIT 1A3

UNIT 1A3A1

L.P.-H.P. BANDPASS FILTER
100-200MC ± 0.1DB
3DB PTS 88MC; 226MC
40DB PTS 50.6MC, 396MC
I.L. = 0.2DB

UNIT 1A3A2

CONVERTER

AMPLIFIER	MIXER	IF AMPLIFIER
100-200MC	IN416E	f_o = 775MC
+20DB	-6DB	BW = 15MC
P.V = 0.4DB		+11DB
GL6299 (3)		GL6299 (1)

1A3R1 — 20DB PAD

UNIT 1A3PS1

REGULATED DC POWER SUPPLY	REGULATED DC POWER SUPPLY
+200V @ 75MA	+6.3V @ 3AMPS.

20DB PAD — 1A3R2

TO UNIT 1A2S2

UNIT 1A4

UNIT 1A4A1

L.P.-H.P. BANDPASS FILTER
200-400MC ± 0.1DB
3DB PTS. -175MC, 455MC
40DB PTS. -100.5MC, 796MC
I.L. = 0.2DB

UNIT 1A4A2

CONVERTER

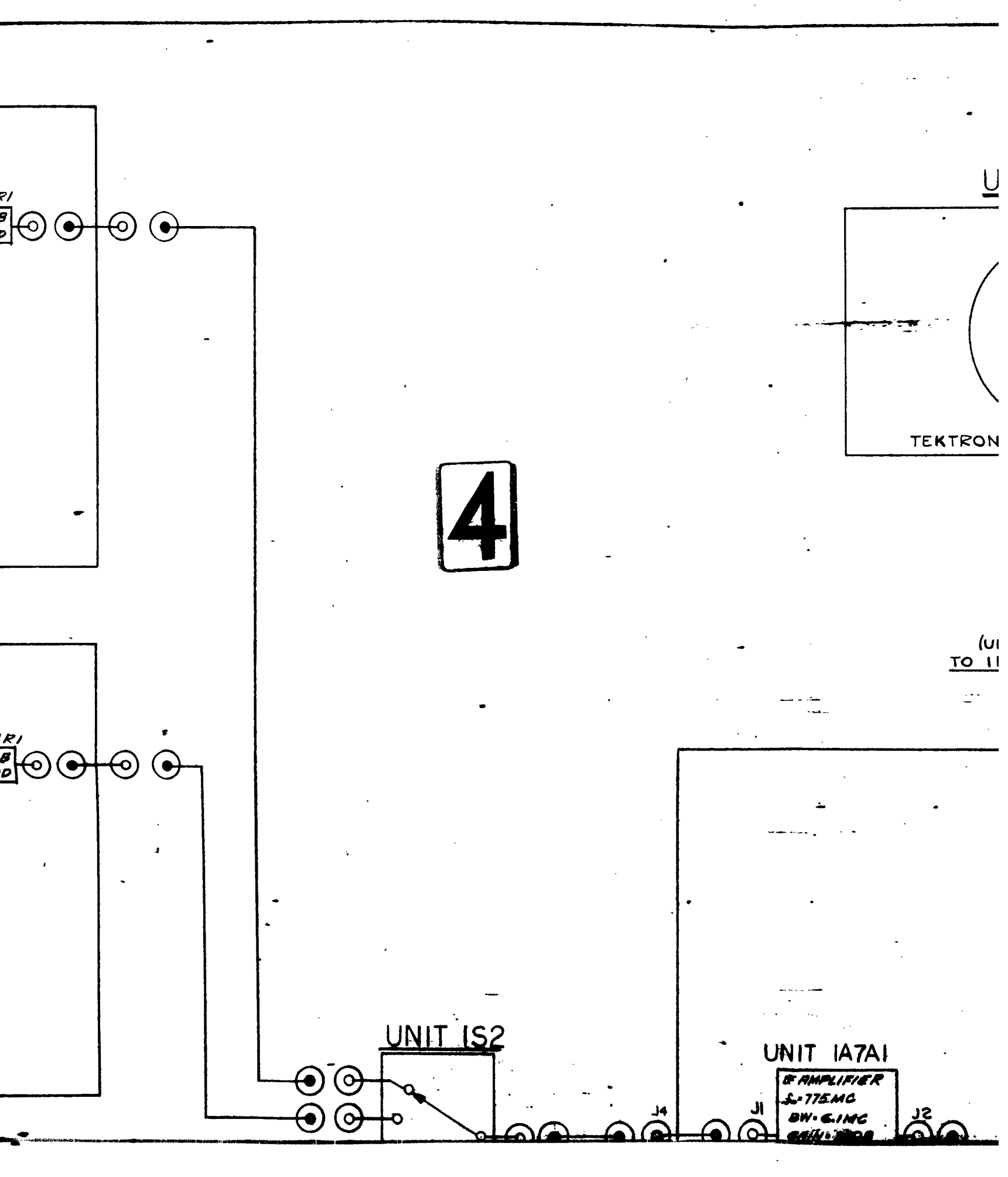
AMPLIFIER	MIXER	IF AMPLIFIER
200-400MC	IN416E	f_o = 775MC
+20DB	-6DB	BW = 15MC
P.V. - 0.4DB		+11DB
GL6299 (3)		GL6299 (1)

1A4R1 — 20DB PAD

UNIT 1A4PS1

REGULATED DC POWER SUPPLY	REGULATED DC POWER SUPPLY
+200V @ 75MA	+6.3V @ 3AMPS

20DB PAD — 1A4R2


4
UNIT 1S2
UNIT 1A7A1
IF AMPLIFIER
J1
J2
J4
TEKTRON

UNIT 1A9

5"
SCOPE

RONIX MODEL # RM 15-MOD101

5

(UNIT 1A1R1)
TO IF ATTENUATOR

J6 J5

15DB PAD 1A7R2

UNIT 1A7A2

BANDPASS FILTER

J1 J2

UNIT 1A8

UNIT 1A8PS1
DC POWER SUPPLY REGULATED
200V@100MA IN
205-210@250MA

UNIT 1A8PS2
DC POWER SUPPLY REGULATED
+30V@350MA
+33V@400MA

UNIT 1A8PS3
DC POWER SUPPLY REGULATED
-20V@150MA
-23V@150MA

UNIT 1A8PS4
DC POWER SUPPLY REGULATED
+6.3V@7.5A
UNREG
6.3VAC@3.0A
(TO UNITS 1A1 1A2 & 1A7)

6

(UNIT 1A1S3)
TO LIN LOG SWITCH

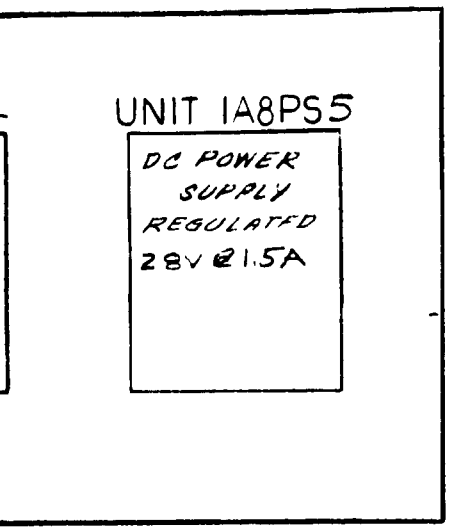
UNIT 1A7

J1

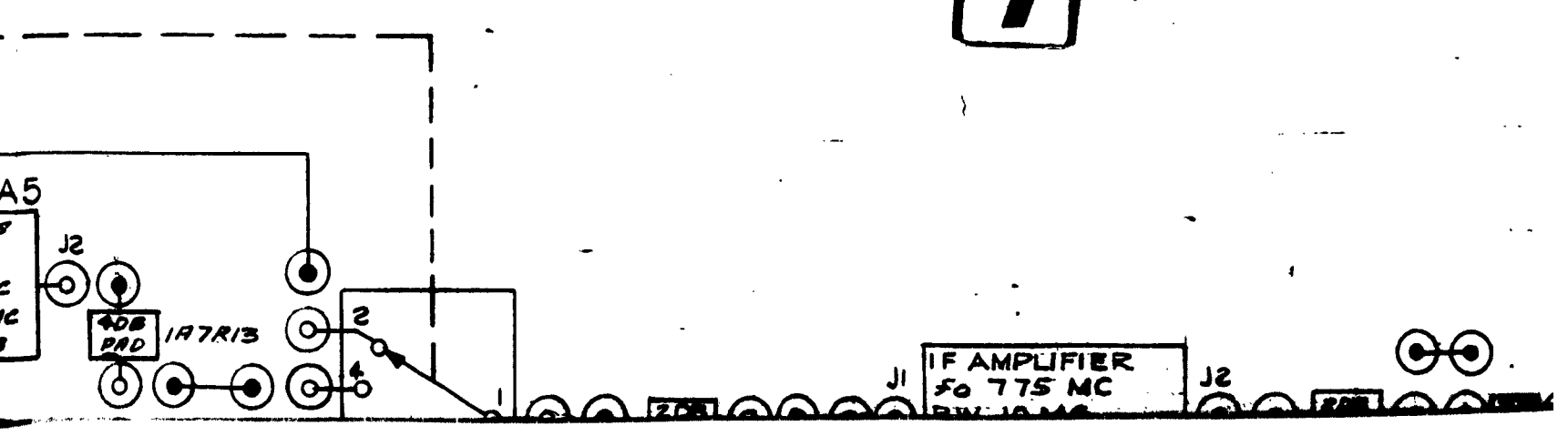
UNIT 1A7A7
P.P.
LIN LOG IF AMPLIFIER
f_0 = 775 MC
BW = 6 MC
LIN GAIN = 45 DB
LOG GAIN = 35DB
GL6299 (6)
IN416B (1)
IN916B (7)
2N1492 (2)
J3
J1
J2
2DB PAD
2DB PAD
1A7R10
15DB PAD
1A7R9
1A7R11
4DB PAD

UNIT 1A7A5
BANDPASS FILTER
f_0 = 775MC
BW = 1.6MC
I.L. = 7DB
J1
J2

UNIT 1A7A17
J1
LIN LOG IF PRE AMPLIFIER
f_0 = 775MC
BW = 1.0MC
J2


UNIT 1A8PS5
DC POWER SUPPLY REGULATED 28V @1.5A

7


A5
J2
40B PAD
1A7R13
2
4
1
J1
IF AMPLIFIER
fo 775 MC
J2

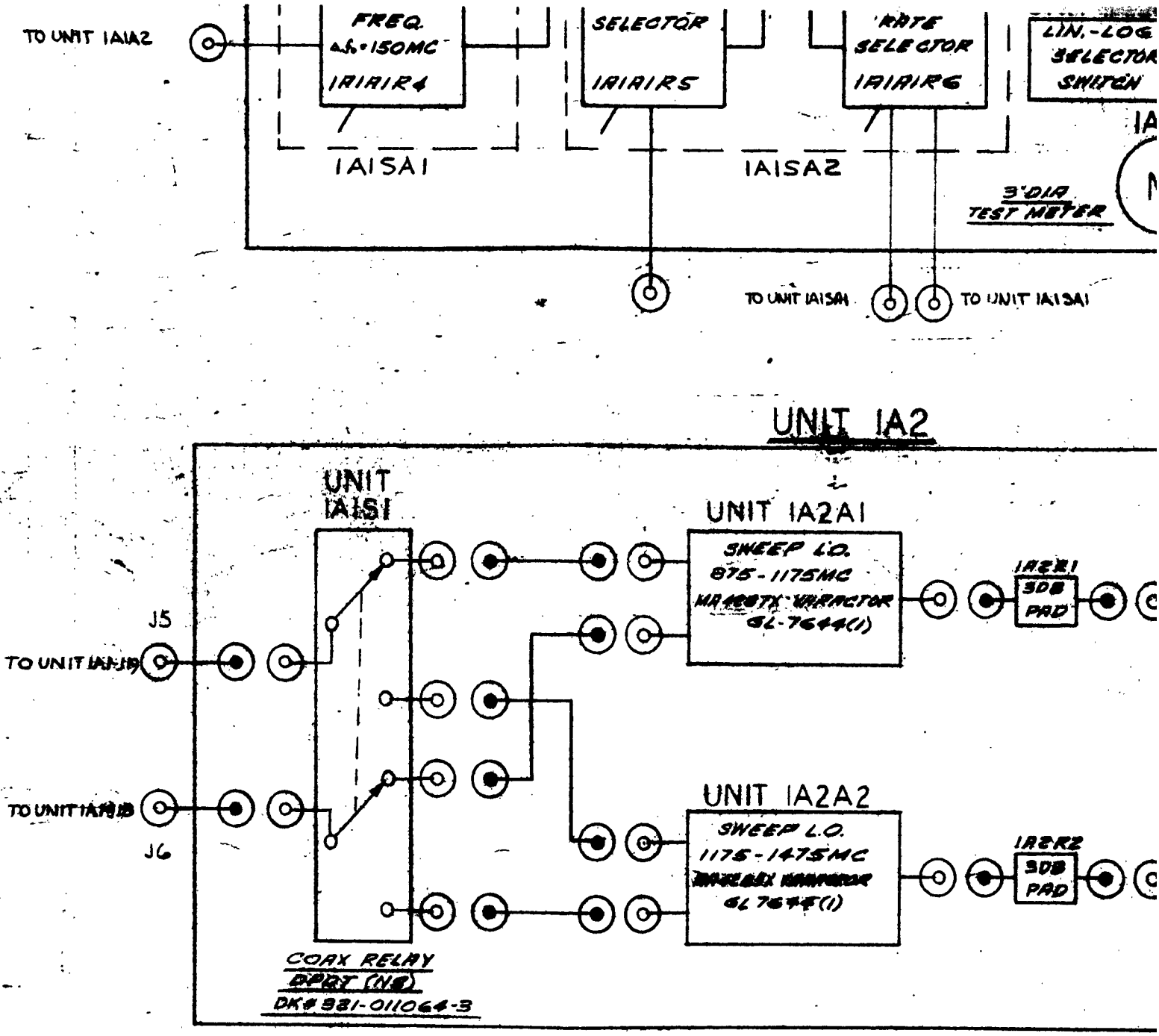
REVISIONS			
ISSUE	DESCRIPTION	DATE	BY
B	REVISED	7/26/62	FP

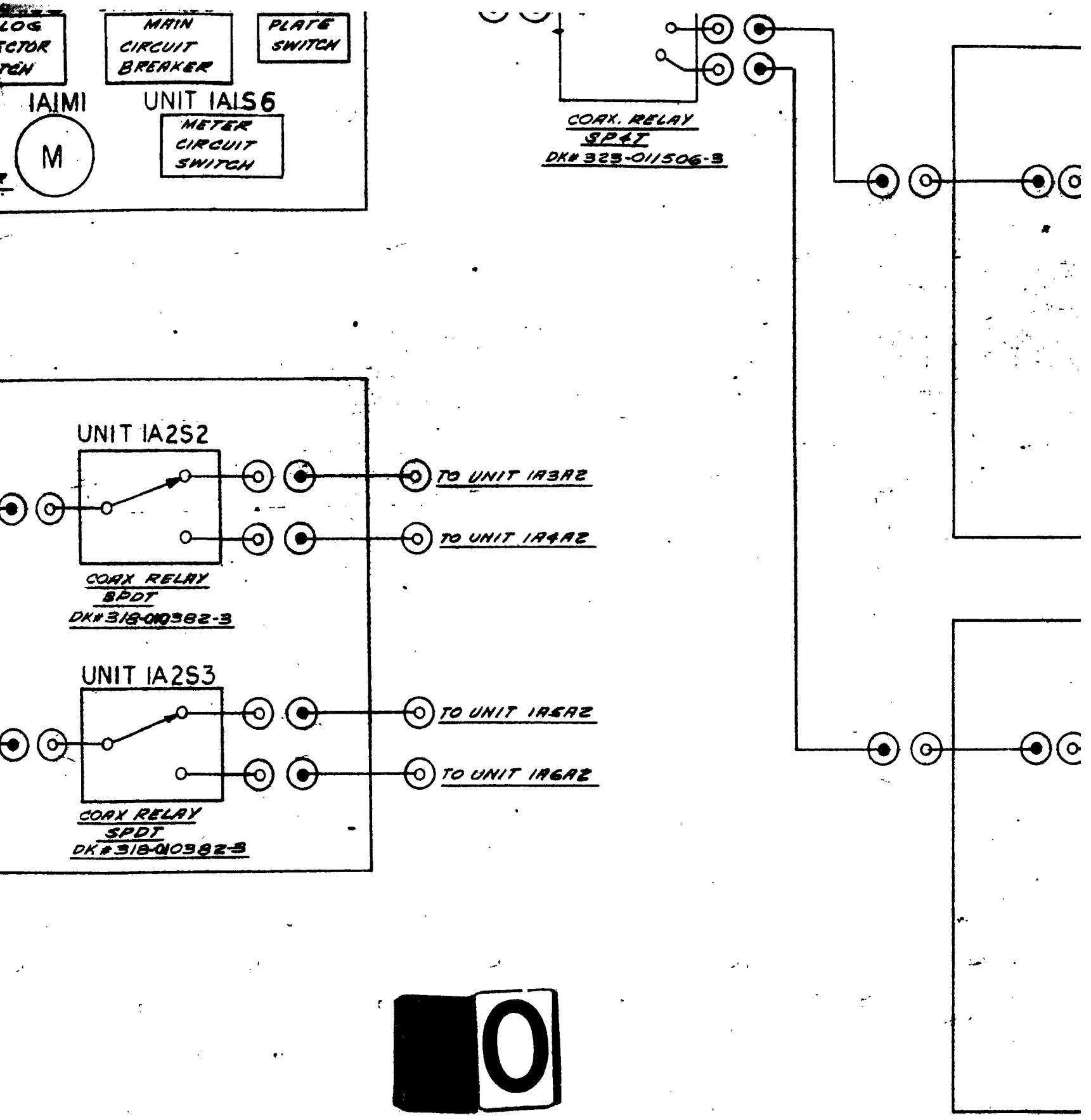
8

UNIT 1A7A8

POWER	LINEAR
I.F. AMPLIFIER	DETECTOR
fo = 775MC	MA4E08X
BW = 10MC	

J1 J2 J3 VIDEO OUTPUT


TO UNIT 1A1A2
FREQ.
Δf = 150MC
1R1R1R4
SELECTOR
1R1R1R5
RATE
SELECTOR
1R1R1R6
LIN.-LOG
SELECTOR
SWITCH
1A1SA1
1A1SA2
3" DIA
TEST METER
TO UNIT 1A1SA1
TO UNIT 1A1SA1
UNIT 1A2
UNIT
1A1S1
UNIT 1A2A1
SWEEP L.O.
875 - 1175MC
MAGNETIC VARACTOR
6L-7644(1)
1A2R1
3DB
PAD
J5
TO UNIT 1A1J9
TO UNIT 1A1J10
J6
UNIT 1A2A2
SWEEP L.O.
1175 - 1475MC
6L 7644(1)
1A2R2
3DB
PAD
COAX RELAY
DPDT (NS)
DK# 921-011064-3


MAIN CIRCUIT BREAKER
PLATE SWITCH
1A1M1
M
UNIT 1A1S6
METER CIRCUIT SWITCH
COAX. RELAY SP4T
DK# 325-011506-3
UNIT 1A2S2
TO UNIT 1A3A2
TO UNIT 1A4A2
COAX RELAY SPDT
DK# 318-010382-3
UNIT 1A2S3
TO UNIT 1A5A2
TO UNIT 1A6A2
COAX RELAY SPDT
DK# 318-010382-3

UNIT 1A5

TO UNIT 1A6S3

UNIT 1A5A1

L.P.-H.P. BANDPASS FILTER
400-700MC ± 0.1DB
3DB PTS. 352MC, 795MC
40DB PTS. 201MC, 1390MC
I.L. = 0.2DB

UNIT 1A5A2

CONVERTER

AMPLIFIER	MIXER	IF AMPLIFIER
400-700MC	IN416E	ƒo = 775MC
+20DB	-6DB	BW = 15MC
P.V-0.4DB		+11DB
GL6299(4)		GL6299(1)

1A5R1 — 20DB PAD

1A5R2 — 20DB PAD

UNIT 1A5PS1

REGULATED DC POWER SUPPLY	REGULATED DC POWER SUPPLY
+200V @ 75MA	+6.3V @ 3AMPS

1

UNIT 1A6

TO UNIT 1A2S3

UNIT 1A6A1

L.P.-H.P. BANDPASS FILTER
700-1000MC ± 0.1DB
3DB PTS. - 654.6MC, 1000MC
40DB PTS. - 421MC, 1200MC
I.L. = 0.2DB

UNIT 1A6A2

CONVERTER

AMPLIFIER	MIXER	IF AMPLIFIER
700-1000MC	IN416E	ƒo = 475MC
+20DB	-6DB	BW = 15MC
P.V-0.4DB		+11DB
GL6299(4)		GL6299(1)

4DB PAD — 1A6

1A6R2 — 20DB PAD

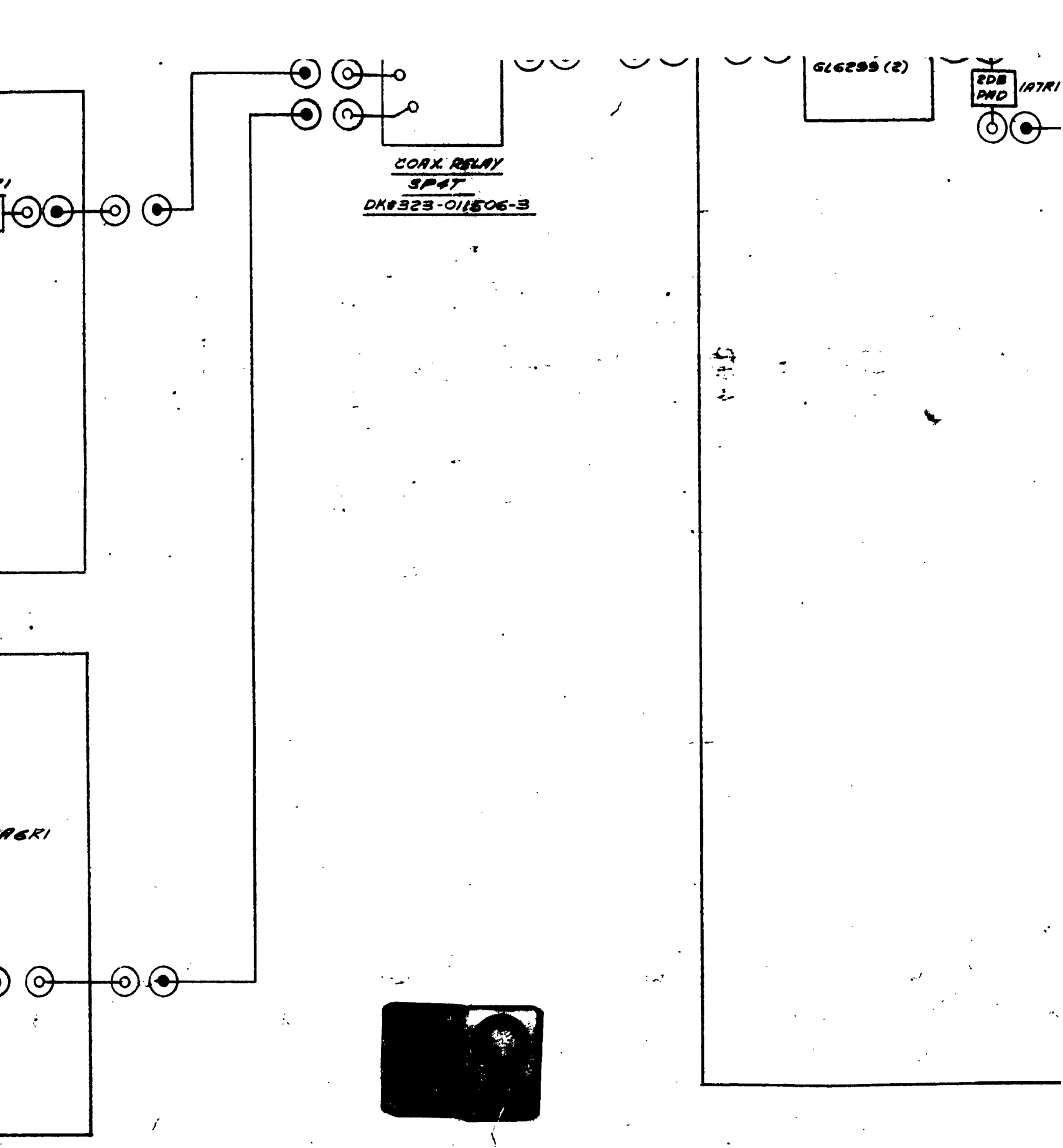
UNIT 1A6PS1

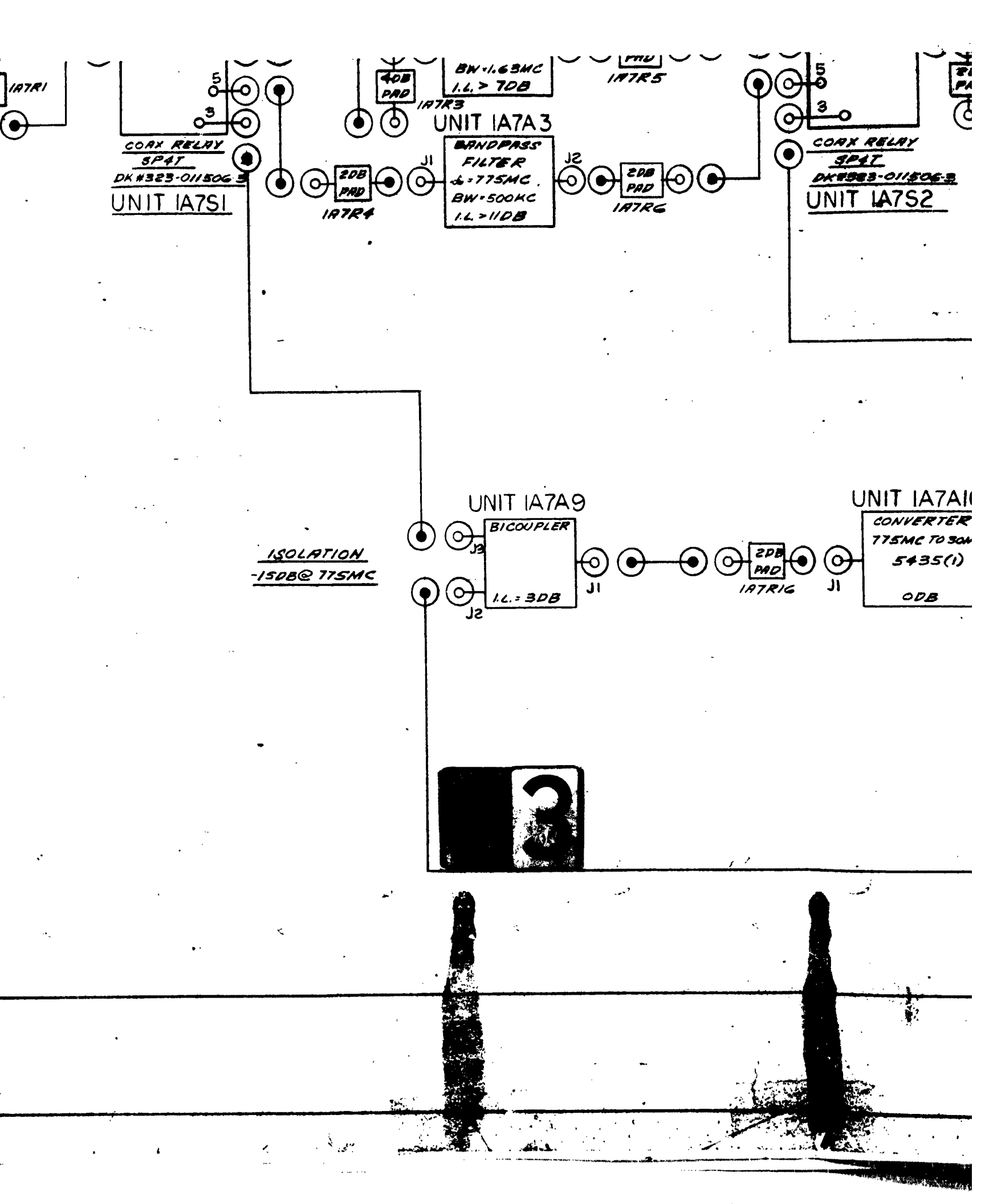
REGULATED DC POWER SUPPLY	REGULATED DC POWER SUPPLY
+200V @ 100MA	+6.3V @ 3AMPS

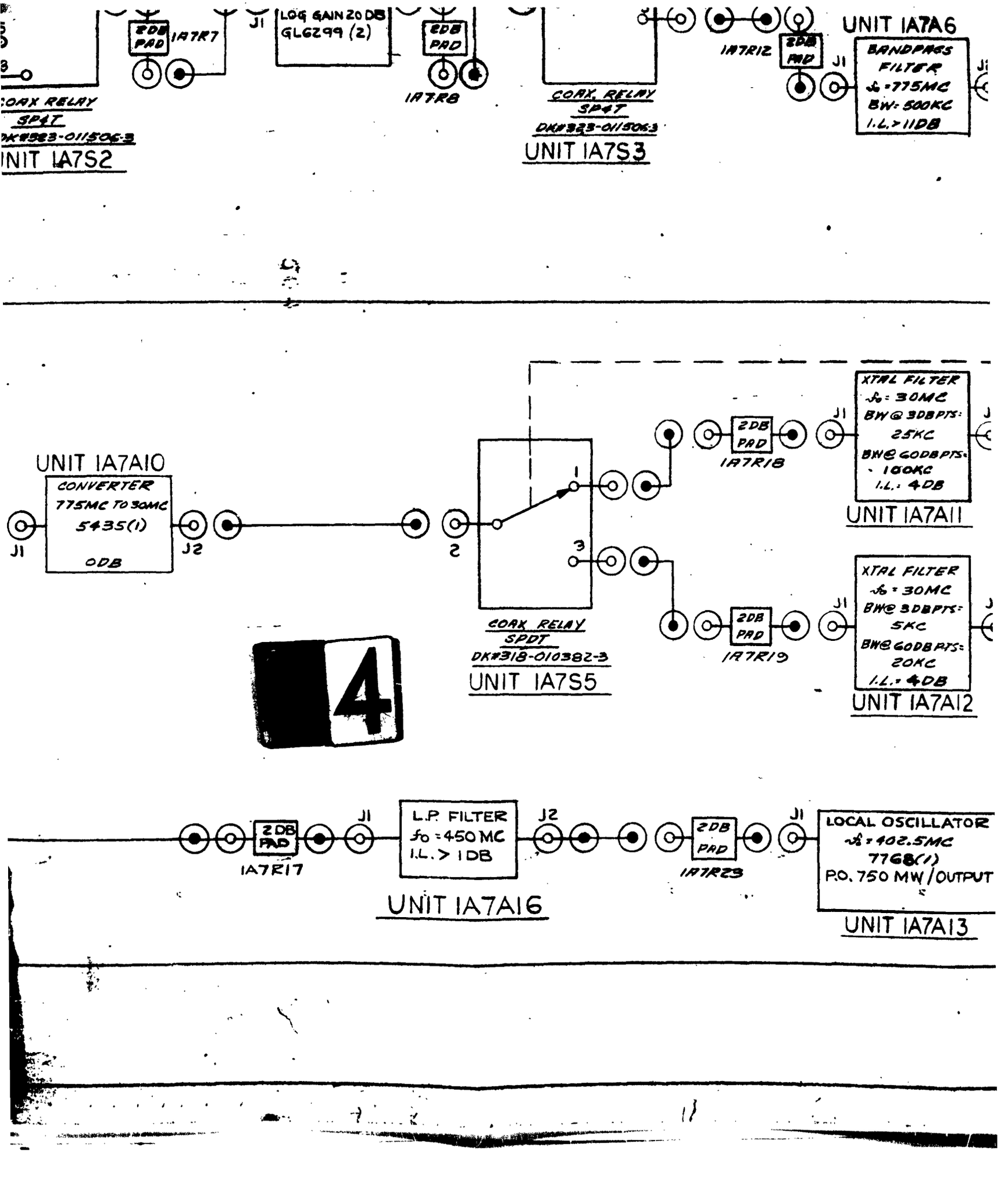
UNIT 1A6A3

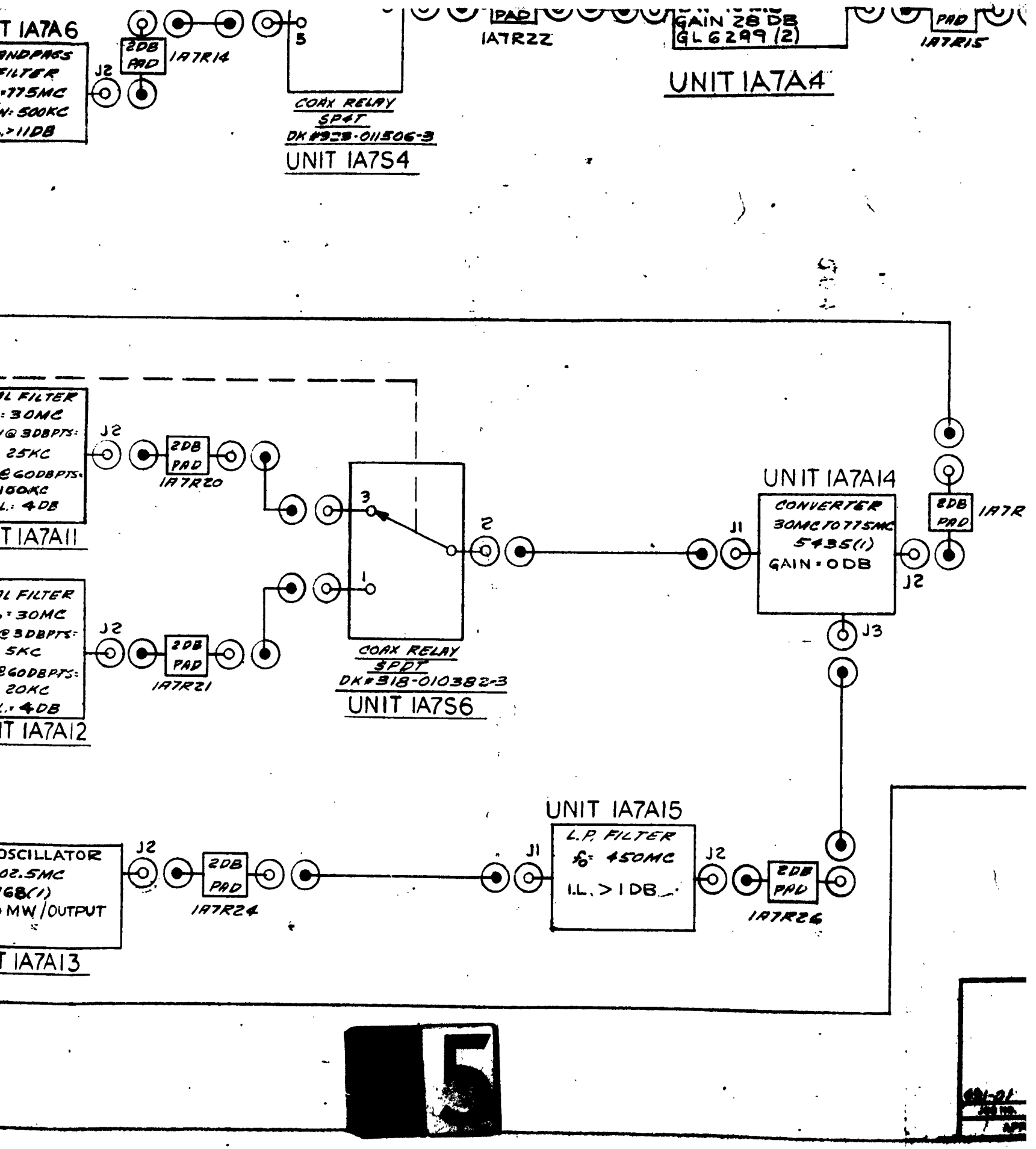
475-775MC CONVERTER
MIXER 5485(1)
LO 7391(1) 1250 MC

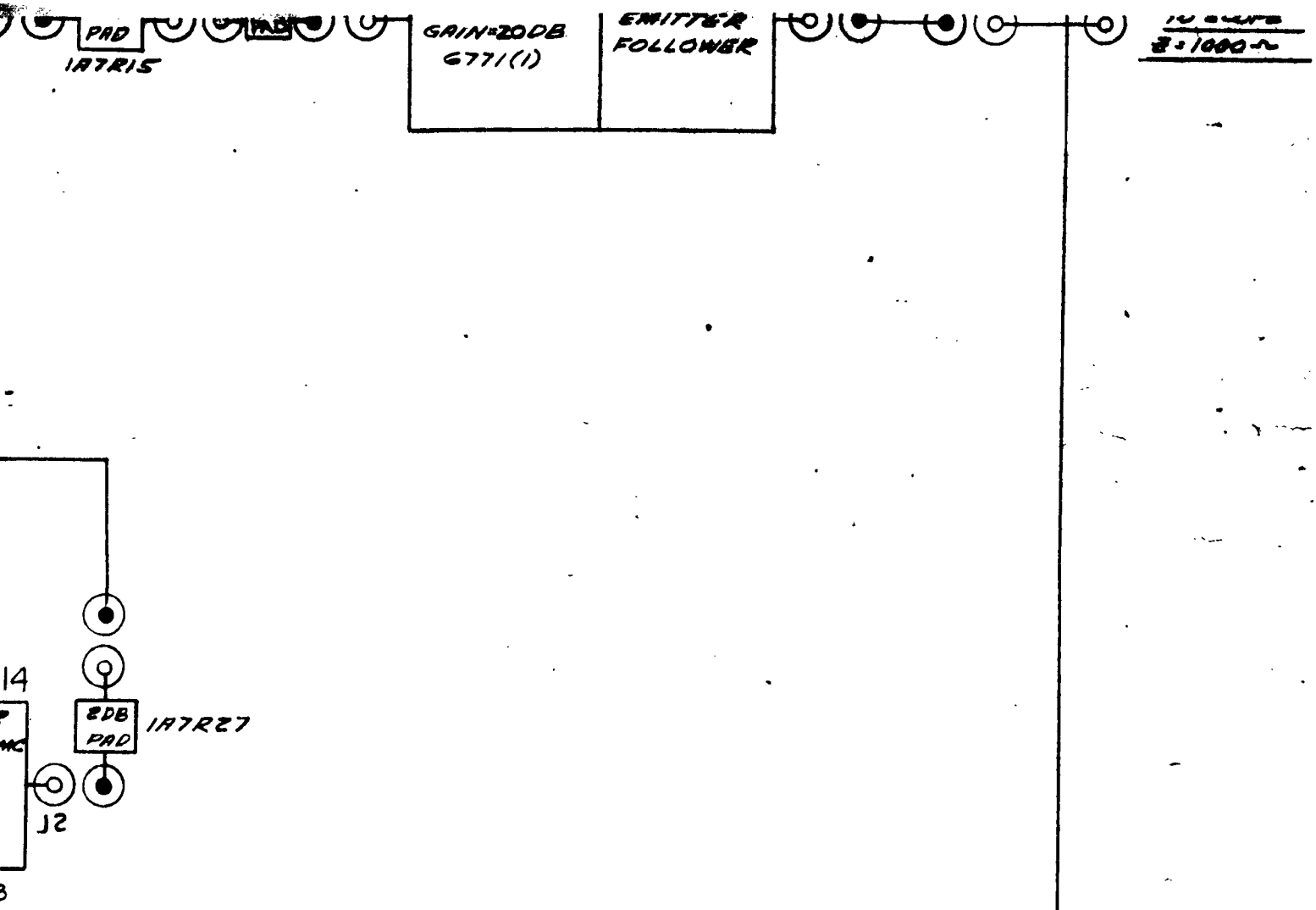
1A6R3 — 20DB PAD


GL6299 (2)
2DB PAD
1A7R1
COAX. RELAY
SP4T
DK#323-011506-3
A6R1


1A7R1
5
3
COAX RELAY
SP4T
DK#323-011506-5
UNIT 1A7S1
40DB PAD
1A7R3
BW=1.63MC
I.L.>7DB
UNIT 1A7A3
BANDPASS FILTER
f=775MC
BW=500KC
I.L.>11DB
J1
J2
2DB PAD
1A7R4
2DB PAD
1A7R6
1A7R5
5
3
COAX RELAY
SP4T
DK#323-011506-5
UNIT 1A7S2
ISOLATION
-15DB@ 775MC
UNIT 1A7A9
BICOUPLER
J2
J2
I.L.=3DB
J1
2DB PAD
1A7R16
J1
CONVERTER
775MC TO 30M
5435(1)
0DB


COAX RELAY SP4T
DK#323-011506-3
UNIT IA7S2
2DB PAD
IA7R7
J1
LOG GAIN 20 DB GLG299 (2)
2DB PAD
IA7R8
COAX RELAY SP4T
DK#323-011506-3
UNIT IA7S3
IA7R12
2DB PAD
J1
UNIT IA7A6
BANDPASS FILTER
fo = 775MC
BW = 500KC
I.L. > 11DB
UNIT IA7A10
CONVERTER
775MC TO 30MC
5435(1)
0DB
J1
J2
2
1
3
COAX RELAY SPDT
DK#318-010382-3
UNIT IA7S5
2DB PAD
IA7R18
J1
XTAL FILTER
fo = 30MC
BW @ 3DB PTS: 25KC
BW @ 60DB PTS: 100KC
I.L. = 4DB
UNIT IA7A11
2DB PAD
IA7R19
J1
XTAL FILTER
fo = 30MC
BW @ 3DB PTS: 5KC
BW @ 60DB PTS: 20KC
I.L. = 4DB
UNIT IA7A12
4
2DB PAD
IA7R17
J1
L.P. FILTER
fo = 450 MC
I.L. > 1DB
J2
UNIT IA7A16
2DB PAD
IA7R23
J1
LOCAL OSCILLATOR
f = 402.5MC
7768(1)
P.O. 750 MW/OUTPUT
UNIT IA7A13


T IA7A6
BANDPASS FILTER
=775MC
N= 500KC
.>11DB
J2
2DB PAD
IA7R14
5
COAX RELAY
SP4T
DK#923-011506-3
UNIT IA7S4
PAD
IA7R22
GAIN 28 DB
GL 6299 (2)
UNIT IA7A4
PAD
IA7R15
L FILTER
=30MC
@3DBPTS:
25KC
@60DBPTS:
100KC
L.= 4DB
T IA7A11
J2
2DB PAD
IA7R20
3
2
1
UNIT IA7A14
CONVERTER
30MC TO 77.5MC
5435(1)
GAIN = 0DB
J1
J2
J3
2DB PAD
IA7R
L FILTER
=30MC
@3DBPTS:
5KC
@60DBPTS:
20KC
L.= 4DB
T IA7A12
J2
2DB PAD
IA7R21
COAX RELAY
SPDT
DK#918-010382-3
UNIT IA7S6
OSCILLATOR
02.5MC
68(1)
MW/OUTPUT
T IA7A13
J2
2DB PAD
IA7R24
UNIT IA7A15
L.P. FILTER
fc= 450MC
I.L. > 1 DB
J1
J2
2DB PAD
IA7R26



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891-01 JOB NO. / NEXT ASSY		ALL DIMENSIONS IN INCHES, UNLESS OTHERWISE SPECIFIED TOLERANCES: FRACTIONS ± 1/64 ANGLES ± 1/2° DECIMALS .XX ± .010 .XXX ± .005	DRAWN	BLOCK DIAGRAM SPECTROSCOPE
APPLICATION		MATERIAL: ~	CHECKED	APPLIED RESEARCH INC. WASHINGTON NEW JERSEY
		FINISH: ~		
			SCALE	UNIT WT.